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Third Review Meeting on MED POL – Phase III Monitoring Activities

Palermo (Sicily, Italy), 12-15 December 2005

REPORT OF THE THIRD REVIEW MEETING ON MED POL – PHASE III MONITORING ACTIVITIES

Table of contents

Report

Annex I: List of participants

Annex II: Agenda

Annex III: Conclusions of the meeting

Introduction

1. In the framework of MED POL-Phase III (1996-2005), two meetings on monitoring were held in Rome (December 2001) and at Saronida (Attica, Greece, December 2003).

2. In accordance with the recommendation adopted at the Thirteenth Meeting of the Contracting Parties to the Barcelona Convention (Catania, November 2003), to formulate, implement and operate permanent monitoring programmes, including the newly adopted eutrophication programme, in accordance with the agreed MED POL objectives and methods, the Secretariat convened and organized, in cooperation with INFO/RAC and the Sicilian Region, the Third Review Meeting on MED POL – Phase III Monitoring Activities. It was held from 12 to 15 December 2005 at the Villa Malfitano, Palermo (Sicily, Italy).

Participation

3. Representatives of the following Contracting Parties attended the meeting: Bosnia and Herzegovina, Croatia, Cyprus, Egypt, European Commission, France, Greece, Israel, Italy, Lebanon, Monaco, Morocco, Serbia and Montenegro, Slovenia, Spain, Syrian Arab Republic, Tunisia and Turkey.

4. The following intergovernmental and non-governmental organizations were also represented by observers: International Atomic Energy Agency (IAEA), World Health Organization (WHO), "Amici per la Vita Onlus", and Ocasa Onlus. A number of invited experts were also present including a representative from QUASIMEME.

5. The Secretariat of MED POL, which served as the secretariat for the meeting, was represented by its Coordinator and its two programme officers, in cooperation with INFO/RAC. MAP's Regional Activity Centre for the Specially Protected Areas (SPA/RAC, Tunis) was also represented.

6. The full list of participants can be found in **Annex I** to this report.

Agenda item 1: Opening of the Meeting

7. Mr. Scoma, Councillor for Labour, Region of Sicily, opened the Meeting and welcomed the participants to Palermo. He thanked MAP for having chosen Sicily once again for an important meeting on the protection of the Mediterranean, immediately in the wake of the adoption by the Contracting Parties to the Barcelona Convention, at their meeting in Slovenia, of the Mediterranean Strategy for Sustainable Development (MSSD), and of their approval of the accession of the Region of Sicily to the MCSD in the local authorities group. The MSSD, to whose elaboration the Italian ministry had lent active support, together with the Euro-Mediterranean Partnership and the European Neighbourhood Policy, would help the local authorities of the Mediterranean to meet their obligations regarding the environment and sustainable development. He welcomed the new mission recently awarded to INFO/RAC to focus on information and communication policy, much needed in order to raise awareness of environment and development issues in Mediterranean society as a whole.

8. Mr. Aldo Scimè, President of the “Giuseppe Whitaker” Foundation, briefly outlined the history of the Villa Malfitano and its park located in the heart of Palermo, whose owners were proud and delighted to host the meeting, and of the Foundation itself, which also owned Mozia, an island rich in archaeological finds of the Phoenician and Punic civilizations, on display in a museum. The Foundation had revived the production of Marsala wine, and thus could be seen as a precursor in the field of sustainable development since its aim had, from the outset, been to reconcile economic growth with respect for ways of life, culture and traditional landscapes.

9. Mr. Sergio Illuminato, Director General, INFO/RAC, recalled that, as head of an environment NGO, he had since 1993 jointly organized some 16 MED POL meetings. As such he felt close to the programme’s activities and objectives. Thanks to INFO/RAC, however, new perspectives were opening up. Given a new mandate by the Contracting Parties, the Centre would be able to do more and better by making available state-of-the-art information and communication technologies (ICTs) to serve the objectives of not only MED POL but of the whole Barcelona system. The participants could therefore count on his Centre’s assistance to ensure that their work could be carried out in the best possible conditions.

10. Mr. F.S. Civili, MED POL Coordinator, thanked the Sicilian authorities, the Whitaker Foundation and INFO/RAC for their support, their warm welcome and the conditions in which the meeting had been organized, in a location of outstanding heritage value. Over the years a special link had been forged between Sicily and MED POL, beginning with the signature in Syracuse, in 1996, of the amended version of the LBS Protocol. The meeting just opened was an especially important one: the permanent monitoring and assessment activities had, from the beginning, been the backbone of MED POL, but with the launch of the Strategic Action Programme (SAP MED) and the perspective of the entry into force of the revised Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (LBS Protocol), they would take on an even greater scope. Moreover, Phase III of MED POL was nearing completion and had recently been evaluated by a team of independent consultants; most of the information needed to take stock of the programme and examine its future direction had been made available. Indeed the principles and objectives of Phase IV had just been approved by the Contracting Parties at their Fourteenth Meeting, in Portoroz, but the operational details remained to be elaborated and specified. The current meeting therefore was the first opportunity to carry out a brainstorming session on the subject, on the basis of the successes and shortcomings of Phase III, with the help of the external experts who had helped to evaluate the various components of the monitoring activity. The Secretariat expected the work of the four-day meeting to provide clear indications of the future direction to be taken.

Agenda item 2: Election of Officers

11. Acting on a proposal by the Secretariat, and taking into account the informal consultations held earlier between delegates, the Meeting unanimously elected the following Officers:

Chairperson:	Mr. Nenad Smodlaka (Croatia)
Vice-Chairperson:	Ms. Fatma Abou Shouk (Egypt)
Rapporteur:	Ms. Vassiliki-Angélique Catsiki (Greece)

Agenda item 3: Adoption of the Agenda and Organization of Work

12. The meeting adopted its agenda as circulated under reference UNEP(DEC)/MED WG 282/1, and to be found in **Annex II** to this report. The Secretariat informed the Meeting that as yet there were no plans to set up working groups and that agenda item 6, on the organization of Phase IV monitoring activities, would be the subject of a brainstorming session.

Agenda item 4: Review and analysis of MED POL Phase III monitoring activities (1996-2005)Participation

13. The MED POL Coordinator presented document UNEP(DEC)/MED WG.282/3 "Examination and analysis of monitoring activities of MED POL – Phase III", the meeting's working document and, regarding the matter of monitoring activities of monitoring, an extension and update of the first assessment submitted in December 2003 at the Saronida meeting. He recalled the legal obligations contained in the LBS Protocol, on which the monitoring activities were based, and noted that their geographical coverage was still insufficient. The Secretariat had asked countries not participating in MED POL monitoring activities to submit to the present meeting any missing data or at least to submit an overview of the results and methods of their respective programmes. France had recently submitted its data on contaminant levels in biota for 1996-2003, and the Secretariat urged Italy and Spain to follow suit, reiterating its appeal to those three major countries, all EU Members, to finalize a monitoring programme with MED POL. Moreover the meeting could offer an opportunity for countries to explain the institutional, administrative or other reasons for any gaps or shortcomings detected in their monitoring activities.

Database

14. Ms. Çolpan Polat Beken, MED POL Programme Officer, shared some information with the participants on the MED POL database, pointing out that the issue would be further discussed under item agenda 5, on the MED POL Information System. She wished to specify the link with the assessment of data communication concerning 10 countries, presented under section 2.1 of the working document. Virtually all those data had been included in the base, with the exception of those that had been received too late. The conception and the structure of the database had been discussed at the two previous review meetings and were well established. The web version of the database carried an inventory of the monitoring data, programme components, stations and parameters, but not the actual values. For the database, a data verification/validation procedure had been created and applied. Ms. Beken signalled that numerical mistakes had occurred in Annex I to the document on statistics by year and country in the data of the MED POL base and that a corrigendum had been distributed to the participants.

15. In response to comments by two participants, Ms. Beken said that, following an agreement reached with EEA during the Second Review Meeting of Monitoring Activities (Saronida, 2003), the data could be exported to EEA/EIONET in the requisite forms. In 2004 the data concerning two countries had been delivered to EEA. Regarding the accuracy of the data by country, the problem could not be solved automatically in the

loading and routine verification/validation of data, but it could be solved as part of the Data Quality Assurance Activities, demanding specific expertise for each matrix and parameter group.

Evaluation of compliance monitoring activities

16. Mr. Civili presented section 2.2 of the working document on the compliance monitoring, giving details of its main components. The monitoring of types and quantities of pollutants entering the sea was not part of the national programmes but depended on the national baseline budgets (NBBs) of emissions/releases of pollutants established under SAP MED. Generally speaking, it could be concluded that the health-related monitoring of bathing waters had been efficient, whereas that of the shellfish and fish growing waters in general, and that of seafood had been poorly integrated as had that of effluents. They probably called for a review, to base it on effective data instead of theoretical calculations of NBBs reached by means of emission coefficients. He added that the monitoring of compliance in hot spots seldom produced information on that compliance.

Bathing water: recent legislation

17. Mr. George Kamizoulis, Senior Scientist, WHO/MED POL, outlined the state of legislation in the field of bathing water, underscoring the similarity between the current criteria of the EU directive and the WHO guidelines for monitoring and classifying the quality of water by means of intestinal enterococci and *Escherichia coli*. The management measures taken to deal with mediocre quality of bathing water included establishing and regularly updating bathing water profiles in selected beaches, the setting of a timetable for monitoring and classifying water while identifying the possible causes of the pollution, and taking measures to prevent exposure to bathers and reduce the risk of pollution. MED POL had conducted pilot studies in six Mediterranean countries to pinpoint the best way of establishing bathing water profiles and will convene a meeting to define a common methodology on the subject.

18. In response to questions put by participants, Mr. Kamizoulis said that beaches needing monitoring were not only the officially organized ones but any frequented by the public. The choice of beaches to be monitored lay, however, with the countries alone. So that monitoring efforts and the corresponding burden could be evenly spread, especially during the summer season, it was recommended that the authorities reduce the number of samplings carried out at known good quality beaches and focus instead on those known to be mediocre. One representative mentioned the fruitful partnership achieved in his country between the administration and an NGO, which had raised public awareness of the healthiness or otherwise of beaches. Mr. Kamizoulis announced that WHO/MED POL was preparing a document on ways of preventing the pollution of coastal waters by installing submarine outfalls discharging wastewaters far from the coast.

Evaluation of site-specific temporal trend monitoring activities

19. Mr. Civili recalled that, when MED POL had originally envisaged introducing trend monitoring at the onset of Phase III, numerous experts had deemed it to be too ambitious. When the proposal had been put to the review meeting held in Saronida the response had been more positive; in the meantime implementation had shown promising progress. The Secretariat felt that that activity ought to be pursued in view of the useful information it provided.

20. Mr. Robert Precali, UNEP/MAP consultant and expert at the "Rudjer Boskovic" Institute, Centre for Marine Research (Croatia), presented section 2.3 of the working document on trend monitoring. He recalled the definition and objective of that component, the need for data over five years at least to determine a trend and the various methods that could be used: the Mann-Kendall test to detect an ascending or descending monotonic trend, linear regression for a linear trend, or the Lowess smoothing filter for a non-linear trend. A suite of methods called the Trend-y-tector, developed by the RIKZ Institute (Netherlands) for OSPAR members, could easily be used by the Mediterranean countries for their annual trend analysis. Using graphs and tables he went on to demonstrate the results obtained by Albania, Cyprus, Croatia, Greece, Israel, Slovenia, Tunisia and Turkey; those countries' chronological data went back far enough, for the trends of various trace metals in the environment. He mentioned the results obtained by France where the sampling strategy differed from that of the other countries taking part in MED POL-Phase III. That type of monitoring could serve as an important tool for assessing the efficiency of measures taken at the hot spots and to monitor the state of the marine environment, but he added that countries tended not to stick to the strategy adopted at the outset, which could prove problematic. He made some practical recommendations to the participating countries: they should produce a programme handbook on the correct implementation, objectives and methodological approach, and ensure that the general rules for sampling strategy were obeyed, in particular collecting samples according to a method that took into account the size of the organisms.

21. During the ensuing debate, participants said they were impressed by the quality of many of the sets of chronological data and the amplitude of some descending trends. Others underlined the usefulness of detecting not only temporal trends, but also spatial ones, of extending the analysis to organic contaminants, and of taking account both of the analytical variations and of sample size. Views differed over which sampling strategy to recommend. Mr. Precali pointed out that in the absence of a wild organism that showed stability over time, it was preferable to work on caged organisms (e.g. *Mytilus galloprovincialis*). In this context, it was also mentioned that shellfish-aquaculture sites had been chosen as sampling sites by some of the countries. The Meeting made further suggestions regarding the carrying out of similar work as case studies on trends in loads, sediments and even at the community level (by multivariate analysis) considering the ecosystem health as dealt with ecosystem approach.

Data Quality Assurance:

Presentation of the IAEA/MESL

22. Mr. Stephen J. de Mora, Head of the Marine Environmental Studies Laboratory (IAEA/MESL), Monaco, presented section 2.5 of the working document on the Evaluation of Data Quality Assurance Activities. He summed up the thirty years of cooperation with MED POL on the conduct of a data quality assurance programme, which had been successfully pursued throughout Phase III: training courses in Monaco, studies of laboratory performances, quality assurance visits to laboratories, and the provision of standards and of reference methods and materials. In all 61 interns had been trained in metal detection, and 59 in contaminant analysis, with emphasis on nationals of countries in greatest need. MESL also represented MED POL on the QUASIMEME Advisory Board.

23. IAEA/MESL's most difficult task had been monitoring the various laboratories over the years, as they or their staff often changed, or else they did not take a regular part in the exercises. Mr. de Mora used diagrams to illustrate the participation of the laboratories and the performances obtained by some of them in terms of Z-scores, and then went on to mention some of the main problems: contamination (lack of cleaning), mediocre separation methods, poor calibration of instruments, wrong column, use of insensitive techniques (e.g. atomic absorption spectrometric method using flame rather than graphite furnace). The laboratories could be classified according to quality marks; a comparison of the results obtained worldwide and in the Mediterranean showed them to be fairly similar. Generally speaking, the laboratories that took a regular part in the exercises improved their performances over time, offering reliable data, but the participation rate (12 countries out of 21) of laboratories in the region remained disappointing. While the data on metals were good, analysis of organic contaminants continued to pose a serious problem.

Presentation of QUASIMEME

24. Mr. Wim P. Cofino, Manager of QUASIMEME and Head of its Centre for Water and Climate, outlined the history of the project, launched in 1989 as a backup pilot project for the marine environment monitoring programmes of OSPAR, HELCOM and MED POL, with its base in Aberdeen from 1992 to 2005, for the conception and management of a step-by-step scheme for ensuring the quality of marine environment study laboratories. Over 11 years, QUASIMEME had brought together 453 institutes in 47 countries, with over 200 participants each year. In 2005, the project bureau had been transferred from Aberdeen to the University of Wageningen, Netherlands, together with a programme on the determinants (trace metals, polycyclic aromatic hydrocarbons (PAH), chlorobornanes, imposex, etc.) of various matrices, including two routine performance studies per annum of laboratories, with two or three materials tested per study. The Z-score was used as a standard of performance indicator. The programme also included development exercises on organostannic compounds and bromide flame-retarders in marine matrices, shellfish toxins (ASP and DSP), which had been the subject of workshops and conferences. QUASIMEME had seen a significant increase in the percentage of satisfactory data and the number of laboratories obtaining over 75% of such data, both for trace metals and chlorobiphenyls in the biota and for nutrients in seawater. QUASIMEME not only organized aptitude tests but also ensured a genuine worldwide "practice community", taking a holistic approach to improve the quality of chemical and biochemical measurements. Mr. Cofino added that, in early 2006, a new QUASIMEME website would offer a discussion platform with sub-sites for any national groups seeking information exchanges.

25. Following their Presentations on quality assurance, both authors replied to a number of questions. One participant voiced surprise that the performance studies had not provided data according to the extraction type and analytical methods used. Mr. de Mora explained that for two years the Monaco laboratory had been using a statistical presentation known as the "Cofino model"; it took account of that aspect but, within the MED POL system, the laboratories were totally free to use the method or technique of their choice. The same participant also pointed out that, in situ, difficulties arose in sample collection and storage; the director of the Monaco laboratory acknowledged the samples distributed for the exercises were only half-treated but, at the current stage, it was most important to test laboratories' ability to analyse a realistic sample rather than prepare it. Unless internal standards were used, the results would be poor. During external QA visits to laboratories, an external expert could immediately detect a bad habit, a frequent occurrence.

26. Mr. Cofino admitted that, with regard to nutrients, the treatment of samples was an important point, but both concepts and practices had made considerable progress and different methods could still give comparable results. It was not so much the method that counted as the way it was applied. Sometimes 15 years were needed to reach a consensus on a given method.

27. In response to a participant who had asked why the intercomparison materials were not at the detection threshold or did not have low concentrations for different matrices, the true test of a laboratory's capacity, Mr. de Mora and Mr. Cofino both felt that, in the given case, the results of an exercise carried out only once a year were inevitably mediocre and there had indeed been complaints. A compromise solution needed to be found.

Evaluation of coastal water monitoring activities

28. The MED POL Coordinator explained that, under the subsidiary agenda item in question, the countries had been invited, by a letter from the Secretariat, to make Presentations. Nine had given a positive response. The Secretariat's intention had been to obtain from those countries not participating in MED POL monitoring activities any data or information that had not already been communicated, and from countries that did participate any missing information. Coastal water monitoring mainly concerned two marine sites: the hot spots, which were highly polluted or at risk, and the coastal/reference zones, representative of less polluted or unpolluted water, far from the direct impact of pollutants. An examination of data gathered in that context showed that, taking into account the number of fixed monitoring stations in relation with the length of their national coastline, few countries had a sufficient number of such stations. In any case, in view of the rate of geographical coverage, it needed to be emphasized yet again that a proper regional assessment of the coastal waters of the Mediterranean remained an impossibility.

Presentation of national monitoring programmes

Egypt

29. Mr. Ahmed Abou Elseoud, Egyptian Environmental Affairs Agency (EEAA), gave the Meeting a detailed Presentation of the Egyptian national programme for the monitoring of coastal waters in the Mediterranean: Phase 1 - monitoring of water quality (salinity, temperature, suspended matter, visual observations, total coliforms, faecal coliforms and faecal streptococci, and the eutrophication parameter); Phase 2 - monitoring of sediments, of biota (mussels) and of benthos (number of individuals and biomass); 31 monitoring sites around the Mediterranean in 2005-2007: main sources of industrial pollution; sewage from major coastal towns and cities, outlets of the Nile and coastal lakes. Most polluted zones: for eutrophication, the region around Alexandria; for bacterial pollution: region of Alexandria, outlets of Lake Manzala and Port Said; for sediment pollution, El Mex, eastern port of Alexandria, Bay of Abu Qir; for impact on the benthos: eastern port of Alexandria, El Anfushi.

France

30. Mr. René Lalement, French Ministry of Ecology and Sustainable Development, presented the two main networks active in his country: the National Network for the Observation of Marine Environment Quality (RNO), with 21 water measurement stations (temperature, salinity, nutrients, chlorophyll "a", pheopigments), also carrying out passive

biomonitoring (two yearly samples of 40 mussels, determination of metals, organochlorides and PAHs, mussel archiving), and the Network of Biological Integrators (RINBIO), operational since 2000, with 100 stations carrying out active biomonitoring of mussels. Various local networks (Regional Council of PACA, Marseille, Port-Cros, Cannes-Nice Observatories, etc.) completed the setup. Health monitoring of sea and fresh water bathing areas in 2004 had resulted in over 30 000 samplings at 3280 sampling points (faecal coliforms, enterococci, *Escherichia coli*, mineral oils, phenol, surfactants). All the results were published annually and were consultable on the Internet. There was also a French register of pollutant emissions. Mr. Lalement added that, in application of the EU Water Framework Directive, a monitoring programme of hot spots would be defined at the end of 2006 and, in that context, the aim would be to seek coherence with MED POL activities regarding specific commitments.

Greece

31. Ms. Vassiliki-Angélique Catsiki, Hellenic Centre for Marine Research, pointed out that the current Greek network was a consortium of 17 university laboratories and research institutes in 10 areas, covering part of the 17 000 km or so of Greek coastline, namely the gulfs around mainland Greece, Macedonia-Thrace, the Aegean Sea and the islands of Crete, Lesbos and Rhodes, with different types of station: shellfish waters, rivers and outflows, hot spots, coastal/reference zones, pilot biomonitoring, airborne pollution (in the Saronic Gulf, near Athens). Measurement parameters for seawater were: temperature, salinity, dissolved oxygen, chlorophyll, nutrients (nitrates, ammonium, phosphates and silicates), organic contaminants (PAH), and bacterial indicators (CT, CF, SF and EC); and for biota, trace metals and organic contaminants. The pilot biological effects monitoring employed used specific stress (EROD, metallothionein content) and general stress (lysosomal membrane stabilization and DNA stabilization, micronuclei frequency) biomarkers. The available data had been communicated to MED POL, and the final report for 2004-2005 would be submitted in June 2006. Problems concerned the lack of regular funding (suspended between 1999 and 2004), the creation of a permanent network (currently affected by operational difficulties), and the visibility of the monitoring programme (vital for ensuring strong political commitment).

Lebanon

32. Ms. Olfat Hamdan, Lebanese Ministry of the Environment, said that, for the time being, Lebanon had no structured national monitoring, only a set of activities. In 1999, a memorandum of understanding, for 12 months, had been signed between MAP and the Lebanese Ministry of the Environment, in order to prepare the basis for such a programme. The National Council of Scientific Research had been entrusted with carrying out the monitoring, and had 10 stations along the coast to measure the classical parameters in accordance with a protocol complying with MED POL instructions. Monitoring capacities had improved in recent years. But further measures needed to be taken, in particular legislative ones, so that the monitoring programme would be lasting and operationally effective. Ms. Hamdan then presented an overview of the various pressures exerted on the Lebanese coast.

Monaco

33. Mr. André Veglia, Monegasque Directorate of the Environment, Urban Planning and Construction, gave details of the Principality's monitoring programme, carried out at six sampling stations in the bay. Sampling took place once a month on the surface and at a depth of three metres to measure basic parameters. From 1989 to 1997, heavy metals (Cd, Pb, Hg and Cu) had been determined in mussels distributed by size and, since 2001,

the monitoring of mussels and of sediments gathered in the bay had been extended to organochlorine pesticides, polychlorinated biphenyls (PCB), PAHs and organotin compounds. A biomonitoring programme had been operational since 1998, comprising the caging of mussels in five stations and the determination of biomarkers in laboratories: "stress on stress", neutral red retention (NRR) levels, frequency of micronuclei, acetylcholinesterase, and metallothionein content. Between 1974 and 1999, the Principality had also contributed to the French monitoring network (RNO), sampling and analysing seawater at five stations in the far southeast of France, between Saint-Jean Cap Ferrat and Menton.

Italy

34. Ms. Irene Di Girolamo began by confirming that Italy was currently endeavouring to ensure that all the data needed for its monitoring would in future be communicated to MED POL using the appropriate forms. She explained that the Italian programme, used by all 15 regions, had been established by the Ministry of the Environment, APAT and ICRAM, with contribution by the principal research institutes. It currently comprised a total of 63 critical areas and 18 control areas. The compartments studied were: the water column, phytoplankton (diatom and dinoflagellate composition and abundance) and zooplankton (density of copepods and cladocers), Posidonia beds (shoot density, lepidochronology, phenology and "balisage" of the lower limit), with variable sampling frequency, from fortnightly for water and plankton, and twice yearly for sediments, to yearly for Posidonia beds and macrozoobenthos. The same analysis methods were used by all laboratories (Ministry handbook). ICRAM and APAT continually organized a comprehensive training programme aimed at regional laboratory operators, focused on recently introduced analytical methods. In 2003 all laboratories had taken part in the QUASIMEME programme intercalibration. The data were published in full on the Internet. Some 70% of annual financing was paid at the beginning of each year and the balance at the end of year, according to the activities, ship costs and analyses actually carried out.

Morocco

35. Morocco was represented by two delegates. Firstly, Mr. Mohammed El Bouch, National Environment Laboratory, offered an assessment of the situation along his country's Mediterranean coast, which faced four tiers of pressure: municipal and industrial used water; run-off water and leaching (sources of eutrophication); hydrocarbon and chemical discharges by ships (intensity and proximity of maritime transport through the straits of Gibraltar); and uncontrolled discharges. Four major problems dominated the situation: marked erosion, urbanization that was often anarchic, early signs of industrialization along the eastern section of the coast, and degradation of the surface and underground water quality. Five institutions shared between them the various aspects of MED POL monitoring: heavy metal trends in biota (INRH), physical chemistry and heavy metals in effluents (ONEP), heavy metal trends and pesticides in biota and sediments (INH), physical chemistry and heavy metals in effluents (LNE/MATE), trends in sediments, and radioelements in water and sediments (CNESTEN). Morocco had undertaken annual programmes to monitor the microbiological quality of bathing water, with the number of beaches monitored up from 18 in 1993 to 92 in 2005, and an 85.5% rate of compliance levels in the season 2004-2005, i.e. a gradual improvement due to depollution activities, legal measures, improvement of beaches and raised public awareness. One difficulty of an institutional order was the distance of the qualified laboratories (most of which were in Rabat and Casablanca) from the Mediterranean coast.

36. The Chair then gave the floor to Mr. Samir Benbrahim, National Institute of Halieutic Research (INRH, Casablanca), who presented the monitoring of heavy metal contamination levels and trends on Morocco's Mediterranean coasts, as part of the national MED POL programme, with three monitoring sites, at Tangier, M'diq and Nador, and five sampling stations. The organisms monitored were the common cockle (*Cerastoderma edule*) and the Pacific oyster (*Crassostreas gigas*), at a rate of one sampling a year during the winter season, after breeding. The results registered between 1998 and 2005 showed no alarming levels, except at two points along the coast. If the programme were pursued trends would emerge, but would that require backing for reinforcement and improvement of the actions undertaken in the biota.

Spain

37. Mr. Juan Antonio Campillo González, Spanish Institute of Oceanography, presented the various components of his country's monitoring programme. The BIOMEJIMED and MEVOCON projects using wild mussels (*Mytilus galloprovincialis*) as a bioindicator for studying, respectively, the bioavailability of micropollutants and the associated effects along the coasts of the Iberian peninsula, and the temporal trends of polluting agents along the coasts of northern and north-western Spain. The sampling strategy relied on the standardized protocols of MED POL and the Joint Assessment and Monitoring Programme (JAMP): same site, population, depth, period (May-June, pre-spawning), size length interval and number of specimens for each size length to measure trace metals, POP and PAH, taking part in the MESL/AIEA and QUASIMEME intercomparison exercises. In 2006, the trend monitoring of chemical pollution along the Mediterranean coast needed to be extended, using the wild mussels, *Mytilus galloprovincialis* (soft tissue), and the red mullet, *Mullus barbatus* (muscle), as target species. For the biological effect trend monitoring, the biomarkers proposed were: genotoxic lesions, lysosomal membrane stability, EROD and metallothionein content. The results obtained along the coast Mediterranean during the period 1991-2002 had revealed significant descending trends for Pb, Hg and Zn, whereas Cd and Cu were the only metals presenting ascending trends.

Discussions following the country presentations

38. After the Presentation of their respective national programmes, the delegates were invited to make clarifications in response to questions put by participants. The delegate of *Egypt* pointed out that the microbiological criteria selected for health monitoring were those recommended by WHO and that, in his Presentation, he had emphasised the poor conditions prevailing in the regions of Alexandria and the Nile delta, the most densely populated areas, but that further east and west, sections of the Mediterranean coast were less polluted. With regard to eutrophication, samplings were carried out at a depth of 2.5m along the coast and at a distance of 500m therefrom, and the parameters were measured in water only, not in the sediments. The delegate of *France* confirmed that the new list of hot spots to be established at the end of 2006 would, from the beginning of 2007, be subject to operational monitoring, in application of the Water Framework Directive, and that, with regard to the French register of pollutant emissions, it relied on the declarations of industries under a self-monitoring obligation, although the water inspectors could carry out random checks, sometimes followed by stricter measures should those declarations prove incorrect. The river borne inflows of pollutants to the sea, calculated on the basis of chemical and hydrometric measurements, had been communicated to OSPAR and, in 2006, would also be communicated to MED POL, with regard to the Mediterranean.

Generally speaking, the trend was to switch pollution assessment to the biological effects, with chemical effects used for explanatory purposes. As for the analyses, they were carried out by ISO-recognized and -certified laboratories.

39. The delegate of *Greece* said that, for the analysis of sediments, total organic carbon was measured for the purpose of standardizing results. The IAEA expert had insisted on the importance of measuring aluminium, and that element was automatically dosed by the XFR fluorescence technique, although it was not formally part of the programme parameters. With regard to the choice of the patella as a sentinel organism in certain regions of Greece, it was dictated by the rarity of mussel populations in those regions and the inability to transplant mussels in cages. With regard to *Lebanon* and the preparation of its programme, one participant remarked that a coastal management project was about to be launched in the framework of the SPAM, with EC funding, and that certain activities, such as that on indicators, would be of benefit for MED POL's future activities. For *Monaco*, when asked about the very low values of tributyltin and other organotin derivatives found in the sediments, the delegate of the Principality confirmed them but pointed out that, while anti-fouling products were not subject to a specific law, the paints used on ships and pleasure craft came solely from the French market and therefore no longer contained incriminated products, thanks to French and EU standards already in force.

40. Several participants said they had been impressed by the Presentation of the *Italian* monitoring programme, in particular for sampling of *Posidonia* beds, plankton and sea bottom macrozoobenthos. The delegate of *Italy* pointed out that, each year, the data were communicated to the EEA by APAT, and that everything would be done in the future, at the highest level, to meet MED POL's requests for data. Italy was currently coordinating the efforts of Mediterranean countries that were members of the EU in the implementation of the Water Framework Directive. It was pointed out that no funding had yet been obtained from the Commission for the biological part of the monitoring, but the financial support needs, for the benefit of the Mediterranean as a whole, were underlined. Proposals for the submission of projects to be funded by the Commission were being studied. Emphasis was also laid on the monitoring of phytoplankton, and in particular its toxic algal proliferations. The Chairperson of the meeting and two other participants emphasized the need to do more to link coastal water monitoring to high seas monitoring, whose impact could be considerable. The Italian delegation also gave details of the programme's funding modalities, the budget was set for three years and the funds were transferred every year to each of the 15 regions, in proportion of their respective coastlines. The operational technical staff employed by each region and dependent on them varied from 10 to 15 persons, while the central coordination was done in Rome by the Italian Ministry of the Environment, APAT and ICRAM. In response to Ms. Beken who, on behalf of the Secretariat, had asked Italy what its strategy was for monitoring trends, in particular its statistical objectives, it was explained that for several years areas regarded as critical had been selected for that type of monitoring, but a more structured strategy would be applied starting in 2006 and it would be close to MED POL's.

41. The delegate of *Morocco* pointed out that, since the selected organisms spawned in April and May, the sampling was carried out during the winter to avoid the aforementioned breeding period, just as the delegate giving the following Presentation, for *Spain*, also confirmed for the Spanish programme. In 2006, the Spanish Ministry of the Environment would be involving the regions more, as they were empowered to carry out monitoring activities. The decreases in concentrations of contaminants observed at certain

points along the coast - off Barcelona – could be related to a decrease in pollutant inputs from one-off sources. One expert noted that, generally speaking, for the sake of consistency, concentrations should be expressed in dry weight or, failing that, wet weight.

42. Summing up the national Presentations and the comments they had raised, the MED POL Coordinator reiterated what had led the Secretariat to request them: to fill in gaps in data and information regarding certain countries in order to obtain a truly comparative table of the whole Mediterranean, until one day, which he hoped would be very soon, there would be a coherent set of national programmes covering the whole region, concluded in agreement with MED POL. The Secretariat thanked those countries which had responded to its invitation, and Spain, France, Italy and Monaco, which had done so for the first time. It was a major step forward, a kind of “cultural revolution”, that had just taken place in MED POL. What was still missing was an effort to adapt to the aims and strategy of MED POL. That was the message behind the question that Ms. Beken had just put to Italy with regard to strategy. During the debates following the Presentations, the practical scope and impact of the Water Framework Directive had been repeatedly mentioned and the Secretariat, which paid close attention to developments regionally and worldwide, refused the notion that MAP and MED POL were clashing with EU provisions. Nonetheless, it could not accept the idea that MED POL should be altered or restructured in accordance with the Directive. MED POL was responsible for a kind of Mediterranean identity and brought together many countries, more than half of which were not EU members and probably never would be. The Mediterranean context was not that simple and the Secretariat needed to bear that in mind, without overlooking the importance of what was happening on the northern banks.

Biological effects monitoring: Evaluation of pilot activities

43. Mr. Civili recalled that biological effects monitoring, of vital importance since it was the only MED POL component that supplied direct information on the impact of pollutants on marine fauna, had been implemented in the framework of the pilot projects, with the backing of the University of Alessandria and the outstanding and highly active contribution of Professor Viarengo. It went far beyond the funding given by MED POL and was accompanied by a data quality assurance programme, including the organization of individual and group training and intercomparison exercises.

44. Ms. Beken presented section 2.7 of the working document on the pilot projects/programmes of biological effects monitoring and country participation. Currently in five countries, which had acquired some experience in the field, it consisted of routine activities included in their national monitoring programmes, and they resorted to new biomarkers; another country had just launched the component in 2005 while another was doing so following the training of a researcher for that purpose. Two countries had yet to involve in their national programmes the institutes with which the University of Alessandria worked and were invited to do so.

45. Mr. Aldo Viarengo, UNEP/MAP Expert and professor at DISAV-Università del Piemonte Orientale (Alessandria, Italy), presented the technical part of section 2.7, and, in particular, the quality assurance programme implemented in 2004-2005. Outside the Mediterranean, manifest results had already been obtained, at the United Nations, in countries such as Japan, the Republic of Korea, China and the Russian Federation in the field of biomonitoring, as had been demonstrated at an international meeting held in Toyama and at which he had represented MED POL to give details of the biomonitoring

programme. But within the Mediterranean, the results were less promising. Only seven or eight laboratories – or countries – were in a position to use the whole battery of biomarkers recommended by MED POL to assess the stress syndrome in response to contaminants in the biota. In the other countries, laboratories were able to use one or two biomarkers, not always the same ones. Consequently, the programme needed to be made more effective, which called for a methodological standardization. Moreover, the laboratories using the whole range of biomarkers worked on wild animals, which posed an other problem, since the aim of biomonitoring was to study the toxic effects of contaminants on living animals but also to verify that they were the contaminants to blame, and that was not easily done in the case of wild mussels accumulating chemical products over the years, and the detoxicant in order to survive in polluted zones.

46. To take into account those deficiencies and better evaluate relations between biological effects and chemical data on stress-inducing pollutants, it was initially proposed that use be made of caged bivalve organisms (preferably *Mytilus galloprovincialis*). The mussels caged for 30 days came from the same stock, so they shared the same genetic and physiological characteristics and a similar minimal content of toxic chemicals. They did not introduce analytical variations due to factors such as gonad maturation and enabled an exact geographical referencing of the sampling sites. A simplified two-tier approach was then recommended. The first, screening, consisted in the use of a single highly sensitive and costly biomarker such as Lyosomal Membrane Stability (LMS) or Lyosomal Lypofuscin accumulation, an early-warning tool, followed by data on the mortality of mussels indicating highly polluted zones. The second tier consisted, at sites where the LMS was altered but without high mortality, in using a battery of biomarkers to quantify stress syndrome by means of an expert system of classification. The integration of data on the biomarkers and the evaluation of the stress syndrome with chemical results made it possible to identify human activities that contributed to the deterioration of coastal ecosystems.

47. In reply to questions about his Presentation, Mr. Viarengo confirmed that, in his opinion, three to four weeks was the right period of caging so that gonad maturation did not interfere, but extending that to three or even six months might be a solution for studying the accumulation of chemical products, especially when the cages were far from the coast. Coverage of the eastern Mediterranean, which often did not possess the *Mytilus* species, was planned, with the use of a battery of biomarkers for the patella. For the sediments, a sink of pollutants that built up over the years, it did not seem necessary to have biomonitoring activities, since caged organisms expressed the quality of the water column, which was where the contaminants from land-based releases could be found. Referring to a more “ecosystem”, less “chemical” approach to biomonitoring proposed by one participant, Mr. Viarengo said that if the aim was to identify changes in and losses of biodiversity, it was already too late to act when they were detected and that the important point was to prevent: to that end, biochemical monitoring, by alerting scientists to the advance of potential dangers, made it possible to implement a raft of biodiversity conservation measures.

Evaluation of pilot activities for monitoring eutrophication

48. Ms. Beken drew the attention of participants to section 2.8 of the working document and explained its main thrust: background of that monitoring component, implementation in 2004-2005 of the short-term strategy adopted in 2003 with the launching of pilot projects: coastal waters of Slovenia, bay of Mersin (Turkey), bay of Limassol

(Cyprus), gulf of Gabès (Tunisia) and Nador Lagoon (Morocco), corresponding to the three site typologies defined. A programme of data quality assurance had accompanied that monitoring activity, with an exercise organized in 2005 by the Monaco laboratory of the IAEA, and two training courses held in 2003 and 2004 by three Italian institutes. In that connection, she announced a recent publication entitled "Sampling and analysis techniques for the eutrophication strategy of MED POL", MAP Technical Report Series, No.163. Eutrophication was a long-term process, so Ms. Beken insisted on the usefulness of historical data on the sites studied to complete the pilot studies. The gathering of that data had begun in 2005, in the case of Nador and Mersin. That work could be used for establishing a future assessment of eutrophication in Mediterranean. The strategy also provided for the creation of biological indicators to be gradually integrated into the pilot projects. A preliminary proposal had been prepared and was about to be presented to the meeting by Mr Giulio Izzo.

Presentation of the document "MED POL Eutrophication Monitoring Strategy: update report and proposal of new indicators"

49. Mr. Giulio Izzo, UNEP/MAP consultant and Head of Division, Environmental Biology and Nature Conservation, ENEA (Italy), presented the draft proposal entitled "MED POL eutrophication strategy: updated report and proposal for new indicators". He outlined the main notions recently introduced into the conceptual framework of eutrophication, from the stage of the input of nutrients to that of anaerobic processes, via the proliferation of algae, the increase in organic detritus and oxygen depletion, with a different perception of the processes when examining marine ecosystems at different depths. That conceptual evolution laid emphasis on changes in the chemistry and biology of sediments. It therefore called for the introduction of new parameters and indicators that were more in keeping with the changes to the sediments. For the time being, it seemed appropriate to propose: the daily variation of dissolved oxygen (DO), acidic volatile sulphides (AVS, a good indicator of the bacterial reduction of sulphates) and the AVS/Fe index, the area covered by the phytobenthos, potentially useful but not yet proven, the sedimentary organic matter and, in particular, the BPC/OC index (biopolymer organic carbon/total organic carbon). With regard to the DO cycle over 24 hours, it required a costly multiprobe apparatus and efforts were being made to produce a less expensive apparatus for the routine monitoring of eutrophication.

Indicators of stress in the marine benthos

50. Mr. Paolo Magni, IMC - International Marine Centre, Oristano (Italy), recalled that the ad hoc UNESCO/IOC study group on benthic indicators had been established in 1999 for the purpose of developing recommendations for globally applicable indicators to use in measuring the health status of the marine benthos. He presented the conceptual models of the response of the benthos to organic matter enrichment of sediments, and the results of analysis of macroinfaunal and total organic carbon (TOC) synoptic data collected from seven coastal regions of the world. The data were examined to look for patterns of association consistent with conceptual model predictions and to identify TOC critical points corresponding to major shifts in the benthic data. Species richness was selected as the primary response parameter. Results suggested that risks of reduced species richness from organic loading and other associated stressors in sediments should be relatively low at TOC concentrations < about 10 mg g⁻¹, high at concentrations > about 35 mg g⁻¹, and intermediate at concentrations in-between. Predictive ability across these ranges was high based on results of re-sampling simulation. While not a measure of causality, it was

anticipated that these TOC critical points may be used as a general screening-level indicator for evaluating the likelihood of reduced sediment quality and associated bio-effects over broad coastal areas receiving organic wastes and other pollutants from human activities.

Trophic status of coastal waters: potentialities of TRIX index

51. Mr. Franco Giovanardi, Istituto Centrale per la Ricerca Scientifica e Tecnologica Applicata al Mare (ICRAM, Rome), outlined the history of the concept of the trophic status of fresh and sea water, introduced in 1919 by Naumann as an intrinsic property of water masses, later elaborated and fine-tuned by Vollenweider, in 1968-69, when a functional relationship was first established between the loads of nutritive elements released by a water basin and the trophic levels of the receptive waters. Vollenweider also invented, in 1982, prediction models that gained worldwide acceptance. The application of the TRIX index, originally devised for Italian coastal water, had been a milestone in that evolution, bringing together in a single formula all the factors that were the direct expression of productivity (e.g. chlorophyll "a") or the nutritional status (total inorganic nitrogen, total phosphorus, etc.). The values of the TRIX index enabled scientists to classify coastal waters by trophic status. But the terms "eutrophic", "mesotrophic" and "oligotrophic" were used subjectively and arbitrarily, owing to the lack of an internationally accepted classification procedure. One of the reasons why it was difficult to define a threshold value for the various trophic categories of coastal water was that the different systems showed different productivity yields. That had led to the setting of central values for the various categories in accordance with the mean trophic status of the coastal marine areas being studied, while setting quality objectives and establish a relationship between the variations in the TRIX and the value of the biodiversity index.

52. The three Presentations were followed by a debate during which the coordinator (APAT) of MED-GIG (working group of the European Common Implementation Strategy of WFD) responsible for implementing the Water Framework Directive, noted that the MED POL document presented by Mr. Izzo omitted important references to the work of several scientists – in particular from the laboratories of seven Mediterranean countries of the EU – involved in the ongoing elaboration of European guidelines on the same subject. The Chairperson said that the document in question was merely a basis for discussion and that no decision on the subject would be taken, which was confirmed by the Secretariat. Mr. Izzo added that his project was based largely, but in greater detail, on the indicators proposed in the MED POL strategy on eutrophication adopted in 2003 and that, at the time, no group of European experts had made any such proposals. Three participants said that in any case the system proposed by Mr. Izzo called for an adjustment to be made if it were to be applied to the oligotrophic waters of the eastern Mediterranean (Levantine basin), bearing in mind the ecosystem approach that MED POL and MAP were planning to integrate in the near future. Another delegate stressed the systematic complexity of eutrophication; the measurements needed to be chosen in accordance with local situations and therefore a general, region-wide MED POL recommendation would not do. Two other delegates endorsed that opinion, adding that a document of guidelines on eutrophication, in the context of the Water Directive, was still at the provisional stage and scientists from around the Mediterranean were invited to contribute actively.

53. The Chairperson concluded from the discussion that the state of eutrophication was constantly evolving and that what participants had to say demonstrated that any document on a MED POL strategy in that area would require constant work and revision.

54. The MED POL Coordinator informed the meeting of the conclusion of the Secretariat on the sensitive, complex and fundamental issue that was eutrophication, the subject of the previous discussions. The component had properly begun to operate four years earlier, on the basis of a fairly broad agreement among the scientists concerned, as far as the approach to be adopted was concerned. Some considerable experience had been gained through five operational pilot projects, but it had emerged from the discussion that before considering its extension and fleshing out the initial strategy, it was necessary to proceed cautiously, and take decisions only long and hard reflection. With that in mind, the proposal prepared by Mr. Izzo was aimed at feeding that thought process, and it was vital to advance in cooperation with the other regional seas institutions that were very active in that area, such as OSPAR and HELCOM. Nevertheless, the activities already undertaken needed to be pursued: the statistical analysis of gathered data, the launching of new pilot projects, the establishment of a new assessment of eutrophication in the Mediterranean, on the basis in particular of historical data. Nobody called into question the need to include new biological indicators, a consensus on the subject had to be found and, in all evidence, reworking the strategy would require more time. Such was the direction to be taken over the following two years.

INFO-RAC & MED POL: research project on integrating remote sensing data and in situ data

55. Mr. Fabrizio Aversa, INFO/RAC Expert, presented the possibilities offered by the use of satellite data for measuring, over large areas, parameters such as turbidity, chlorophyll and sea temperature. The MED POL project in 2003 had consisted in gathering data on chlorophyll "a", concerning the northern Adriatic. The satellite imagery chosen was MODIS, which could be obtained without paying, and use had been made of appropriate software to carry out the data analysis and compare satellite measurements with on-site measurements. Terra MODIS and Aqua MODIS made it possible to visualise the surface of the earth on a daily basis. In addition to MODIS, the other satellite products used, also free of charge, were HDFLLook and earth.google.com. The technique made it possible to validate data gathering campaigns and could evolve in the future into a system of information available on the Internet, with the automatic inclusion of satellite data, the processing of relevant data and the presentation of results in geographical windows.

56. The INFO/RAC expert stated that the phase just completed was that of feasibility and that a switch would be made to the production phase for other physical parameters. He admitted that earth.google gave historic images that were often out of date whereas MODIS images were accurate. A participant asked for a handbook to be produced to facilitate the use of such techniques and another recalled that the SISCAL was also available; it enabled the use of satellite data to provide information in almost real time on aquatic ecosystems for users without specialized knowledge of Earth Observation (EO).

Evaluation of the ongoing monitoring of loads

57. Ms. Beken presented section 2.6 of the working document, recalling that most of the national monitoring programmes included the monitoring of inputs from one-off the point sources (municipal and industrial sewage outlets and rivers). However, only limited data had been supplied to the MED POL database and it included 640 records of industrial BOD by four countries. The values for water discharge were also available for estimating the annual load released into the sea. Rivers were included in seven national monitoring

programmes, and data had been conveyed by four countries during the period 2000-2004. For the diffuse sources, airborne transport/deposition and transport of pollutants from river basins (water sheds) had given rise, respectively, to the documents on airborne inputs of nitrogen and phosphorus in the south-east Mediterranean and the role of dust phenomena of desert origin (UNEP(DEC)/MED WG.282/inf.3) and on Global News: Export of nutrients from water basins around the world – a focus on the Mediterranean (UNEP(DEC)/MED WG. 282/inf.5).

The role of phenomena of dust originating in deserts/Sahara region in the input of nitrogen and phosphorus in the south-eastern Mediterranean

58. Mr. Barak Herut, Director General, Israeli Oceanographic & Limnological Research, National Institute of Oceanography, Haifa (Israel), presented a report on a partially MED POL- backed research project aimed at assessing the role of dry airborne fallout as a source of nitrogen and of phosphorus in surface seawater around the Levantine basin and its possible impact on new productivity, in particular after dust storms. Over the previous ten years, the frequency of such storms and the intensity of their impact had increased in the eastern Mediterranean. The project had included two campaigns of samplings of aerosols and analyses carried out respectively between April 1996 and January 1999, and between January 2001 and April 2003. According to estimates, the airborne contribution of new nutritive elements to the basin represented 15 to 70% of its productivity. The possible contribution of airborne inputs in relatively high N:P ratios in the deep water of the Levantine basin had been highlighted, but the reason had not been determined. When assessing the speed of impact of a sandstorm during an experiment carried out in May 2002, it appeared that, in view of the linear effect of fresh dust concentrations on bacterial activity, primary production and concentration of pigments, changes due to moderate dust storms were often close to the limit of detection of on-site measurements or remote sensing. While the project had not yet made it possible to respond to certain important questions other than by hypotheses, it seemed plausible to provide, if the frequency of such phenomena continued, a gradual fertilization of water in the eastern Mediterranean and its move to as less oligotrophic status.

59. In reply to Ms. Beken's question as to whether, in his opinion, that MED POL component should be continued in the future, Mr. Berut said that the assessments would need to be integrated into the coastal models and on a basin-wide scale, but that, for the time being, when those airborne inputs were calculated by comparison with inputs from one-off sources, their importance was quite impressive and would probably increase further in the future. In Israel, for example, along given sections of the coast, it was not possible to explain lead trends in sediments only by input from one-off sources, and the importance of airborne inputs had to be taken into account. That observation equally applied to nutrients. The component therefore needed to be pursued. The Chairperson added that it could be applied, with much interest, in other Mediterranean basins. Other delegates in turn emphasized the importance of dispersed inputs of nutritive elements from rainwater and run-off, adding that, in the southern bank countries, if airborne deposits landed and remained on the ground for some time, they were violently washed away in the heavy seasonal rains and ended up in the Mediterranean as heavy loads that were difficult if not impossible to control.

Presentation of GlobalNews

60. Mr. Wolfgang Ludwig, CEFREM - Centre de Formation et de Recherchesur l'Environnement Marin (University of Perpignan, France), said that the GlobalNews initiative brought together an international group of scientists working on the global modelling of river fluxes of nutrients, holding discussions at regular workshops and exchanging sets of data. The aim was to improve and standardize worldwide the existing models on nutritive elements (C, N and P). For the most part, the models were empirical and concerned regression strongly influenced by anthropogenic factors (population density, use of fertilizers, etc.). GlobalNews had already led to the improvement of the DIN model (fluxes of dissolved inorganic nitrogen) and to the establishment of a new DIP model (fluxes of dissolved inorganic phosphorus), but knowledge was still limited on fluxes of particulate N and P. Mr. Ludwig presented simulations of inputs of nutrients into the Mediterranean, but added that the DIN and DIP flux were evolving fast, preventing model simulation. One of the problems was that the models' input parameters were not necessarily adapted to the Mediterranean: for example, whereas 25 Mediterranean dams were registered with GlobalNews, there were in fact some 180 in the Ebro basin alone. The same comment applied to the extraction of river water for irrigation purposes.

61. The Chairperson said that, taking into account the data used to illustrate the Presentation, it could be seen that once again in the Mediterranean, not only in the rivers but also in the sea itself, P was diminishing while the ratio N:P was rising, along with changes to biological structures, in particular in the northern Adriatic. When one expert raised the question of releases of underground water, in relation to precipitations, which also were responsible for inputs of nutrients, Mr. Ludwig said that those inputs were real and often important in the Mediterranean, for example along the Croatian coast, and ought to be integrated into the models that were applicable to the Mediterranean. Mr. Abousamra, MED POL Programme Officer, stressed that, according to the data in the Secretariat's possession, the industrial inputs into the Mediterranean were five times greater than the inputs from the watersheds estimated by GlobalNews-Med, which was questionable, and an issue to be considered in the discussions.

Municipal wastewater treatment plants and waste inputs in Mediterranean coastal cities with a population of over 10 000 inhabitants

62. Mr. Kamizoulis, Senior Scientist WHO/MED POL, recalled that two surveys had been conducted, in 1998-1999 and in 2003, with the assistance of the MED POL national coordinators, to gather Mediterranean-wide data on municipal wastewater treatment plants in service, such as the population served, the year of construction, the degree of treatment of sewage, the quantities of treated and untreated sewage being released. Out of a total population of 58 million inhabitants in 593 towns and cities of more than 10 000 inhabitants, 52 million were served by a sewage network and a treatment plant. With regard to the total number of towns and cities, there was a marked increase in those served by a sewage plant between 1999 and 2003, along with the number of plants applying tertiary treatment in addition to primary and secondary treatment, probably thanks to the application of community legislation on sensitive areas. While direct releases of raw sewage into the sea was still the order of the day, in 2003 there was more information available on the subject, but for direct releases of treated sewage, the information was less readily available for the same year. A new survey would be carried out in 2008, and efforts were need to specify and complete the information on the permanent population served,

technical data on the quantities of treated and raw sewage, and planned work on plants and sanitation systems.

63. In reply to several questions put by participants, Mr. Kamizoulis pointed out that the demographic data basically demonstrated demographic growth of around 10% between 1999 and 2003, but that the reality of those figures actually depended on the official population censuses that had been carried out since then, lacking in some countries. For the estimates of loads of BOD and various nutrients, it would be difficult to obtain all the information required by the national coordinators and estimates would only be possible if they used the coefficient available in the literature. Comparing the figures of the survey against those of the NBBs established in the framework of the SAP would also be difficult, as the two studies had different purposes, with the NBBs focusing on industrial releases.

Review of revised sediment monitoring strategy

64. Ms. Beken presented the section 3 of the working document. She recalled that the sediment monitoring strategy initially adopted had soon proven insufficient for obtaining the temporal trend of a given contaminant in a given site, and the 2003 review meeting had recommended a revision of the strategy. Consequently, the Secretariat had convened a meeting of experts in April 2005. It had produced precious elements for a first revision of the strategy. The IAEA laboratory in Monaco had produced, in cooperation with the MED POL Secretariat and on the basis of the preliminary conclusions of the meeting of experts, a draft text entitled *Methods of sampling and analysing sediments*, which had been submitted to the current meeting, in document UNEP(DEC)/MED WG.282/Inf.5, for examination and discussion.

65. The delegate of Tunisia declared that his country had been implementing the MED POL sediment monitoring strategy since 2000, with data regularly gathered since then. Five years later, everything was being called into question, the method was being changed, with a switch to three annual samples, and perhaps in five years there would be a further revision. That was wasteful, in particular in terms of statistical data analysis. Before any debate on the technical modalities being proposed, would it not be possible to make corrections in order to pursue until 2010, so as to obtain a trend? The delegate of France agreed, adding that that the redefinition of the strategy should take place in Phase IV, enhancing the objective of the effective implementation of legal obligations under the LBS Protocol, Article 8 and Annex I. Also agreeing, the delegate of Slovenia said that the document was a useful basis for discussion and was headed in the right direction.

66. Ms. Beken replied that there was probably a misunderstanding. The revision was an information document, submitted as a draft, and it was too early to interpret it as a complete change of strategy for sediments. As for the frequency, annual or less often, for example, nothing had been decided at the meeting of experts, and the text clearly specified that full latitude was allowed according to the rate of sedimentation and conditions that were specific to each site. Similarly, for the monitoring of a certain fraction of the surface sediment (i.e. <63 μm), there was no need to make changes in the objectives of the ongoing programmes before the decisions of the experts. On the contrary, the selection of sampling sites, the establishment of the sampling network and the numbers of samples that should be taken at each station should be carefully reviewed for each temporal trend monitoring programme. As it was, the present strategy did not produce any information on the precision of the sampling and did not grantee the selection of the most suitable sites for the sediment monitoring. More information was needed from

laboratories and anyone else concerned, but experts from different countries had taken part in the technical discussions initiated by the expert group, which had first met in April 2005. Finally, the document had to be considered as an effort to optimize the programme objectives and provide clear recommendations to the laboratories. The document, after its finalization, should also be considered as a basic reference for the new programmes and the possible revision of the ongoing ones.

67. The participants addressed the modalities of sampling and conservation of sediment samples for laboratory analysis. Storage in freezers was no panacea since some components of the sample continued to undergo degradation and, for example for the organotin, it was necessary freeze them to -30 rather than -20° and for a limited time. Similarly, for organic contaminants, the choice of the lyophiliser was decisive for avoid any contamination. One participant raised the question of lyophilisation-sieving, pointing out that it needed to be done at once and in wet conditions, and an expert had said it was vital to carry out aboard ship which made it difficult in practice. He also stressed that what was lacking the most was knowledge of the variance of the sediment proper in the sampling area, which was why it was necessary to gather more samples, especially at the outset of the programme. The gathering of samples by divers was raised: one expert said that, in certain circumstances and with good equipment and experience, it allowed sampling over a greater surface. There were two major tools for sampling – grab sampler and corer – with different objectives. The core sampling was a gentler technique, which respected finer fractions and allowed for an insight into the evolution of the sediment over time, while the grab sampling allowed for larger volumes to be extracted from undisturbed sedimentary areas, and for long-term analyses. One expert proposed caesium as a vital element for standardization of sediment results, according to the proposal made in a recent scientific paper. A participant said that the discussion on sediments needed to be interlinked with that on eutrophication and the ecosystem approach. Some of the delegates stressed the importance of sediment archiving, something that should be mentioned in the document.

68. Ms. Beken thanked the participants for a discussion that had been full of reflection and precisions and asked them, if they wished to make further contributions, to do so in writing to the Secretariat, so that they could be used by the IAEA/MEL Expert while re-drafting the revised strategy on sediments.

Agenda item 5: MED POL Information System

69. Mr. F.S. Civili pointed out that, while it had for a long time gathered data mainly on pollutant levels, since SAP MED had been launched MED POL had been accumulating large amounts of data on pollution sources. Considering the new technical opportunities available in information and communication, it was necessary to consider moving to a higher stage of information management, and it just so happened that the ERS/RAC had just been converted into INFO/RAC, which was willing to offer assistance and its technological means to enable MED POL to establish an operational database for its various tasks. That initiative would enable MED POL to reach a larger audience in the Mediterranean. MED POL had therefore designed a new information system, and INFO/RAC was leading its initial development and testing (a prototype version of the application software is currently being tested and evaluated).

MED POL Information System: the concept

70. Mr. Fouad Abousamra, MED POL Programme Officer, presented the different modules of the system for the coastal water monitoring programme: data administration and management module, database map module, Internet module, Internet map module; for assessments of national emissions/releases databases, a software package would help to evaluate progress made in reducing contaminants in each country with a graphic capacity that included comparisons between regions for each given pollutant. The target groups would be: the Contracting Parties, the RACs and regional programmes, the scientific community, experts and the media. The system would, inter alia, be used for extracting and analysing the data and information produced by MED POL activities, following evolutions over time in the reduction of pollution, trends in contamination levels in the coastal waters and compliance, and for organizing multimedia events, forums and online meetings. The MED POL Internet portal would be the most practical and accessible way of combining all types of information on MED POL and making them accessible to scientists and the general public. The portal would include data, satellite imagery, operational oceanography and simulation (using models) etc.

MED POL infoSYSTEM: Presentation of the INFO/RAC

71. Mr. Alessandro Amici, INFO/RAC, defined the priorities set in the conception of the MED POL InfoSYSTEM: confidentiality and integrity of data, exploitability, functions (entry and management of data in the MED POL base, Intranet functions including data sharing and communication paths, spatial data viewing – GIS). Secure Intranet access would be made possible thanks to a login name and password allocated to each member. The Intranet system would comprise the data of the countries themselves, forms enabling convenient insertion of national data into database from any connected site Internet site. Mr. Amici presented on screen the various means of access to the database: monitoring stations, samples, insertion of new data, MED POL reports: reports could be revised, several persons could work on the same text in different locations, certain reports could be locked. MED POL events would be disseminated by means of a procedure of dynamic announcements and online inscription would be possible. The database would be entirely GIS-enabled, and data could be managed spatially or by dynamic mapping interacting with supplementary geodata layers on coasts, rivers, the national boundaries, etc. For the time being, a prototype would enable the functions of the autonomous MED POL portal to be reproduced. New functions would be added, such as e-mail, videoconference support, etc.

72. In reply to the observations or suggestions made, Mr. Amici said that obviously the network could also include the national or regional experts working with MED POL, enable direct communications between national coordinators, MED POL staff and experts, and also enable the system to act as a library of all MAP and MED POL documents. It would be a dynamic system, which meant that the more it was used the more functions could be designed and added incrementally. The system was scaleable and expandable to meet changing user requirements.

Interoperability of the FR-WISE-MED POL information systems

73. Mr. Lalement, French Ministry of Ecology and Sustainable Development, briefly presented the French system of information on water, the homologous European system WISE which, examined in that way, together with the MED POL system, could not be fully integrated but could be harmonized in such a way as to be interoperable. The objective

was to ensure coherence and convergence of implementation requirements, for example regarding monitoring and reporting, and to have a comprehensive and harmonized monitoring programme meeting all requirements, with converging reporting formats. That harmonization effort, relying on the principles of the European INSPIRE directive, would be made available in conditions that imposed no limits on its use (exclusion of the commercialisation of data, unacceptable in environment matters) and the data issued from several sources should be combined and shared by the users and applications. He summed up saying that such harmonization was desirable and many people were working towards that goal, in particular in the European context.

74. During the debate following the two Presentations, delegates welcomed the developments announced by MED POL and the interactivity among all the parties to the programme. A number of suggestions were made:

A cartographic/spatial superposition or overlay of data would result in several “new” layers of information for each geographical location.

The National Coordinators were expected to use this system more and more, for example for the insertion or correction of their national-level data. It would be useful if they received technical assistance such as training or familiarization with the requisite operations and/or a user handbook.

One delegate proposed that in each country, at each institutional level, a contact person should be appointed who would be able to respond to any request for information from the various systems in which the countries participated: MED POL, WISE, EIONET, OSPAR, etc.

Teleconferences were most useful and MED POL needed to seize the opportunity to network and enhance inter-relationships between scientists, system users and practitioners etc.

Similarly, the flow of remote sensing data and their applied use for monitoring were most promising and the system should include such a facility.

The Secretariat took note of the overall favourable response to the MEDPOL Info SYSTEM and said it would be worthwhile to set up a working group to monitor progress and support its evolution in cooperation with INFO/RAC, whose technical contributions would be decisive. As an overall goal, the full system should become operational by the end of the coming biennium.

75. The MED POL Coordinator recalled that, under the agenda item in question, the meeting was invited to re-examine the mechanism of data fluxes between countries, MED POL and the various such as EIONET, EEA, EC, etc. At the second review of the monitoring activities (Saronida, December 2003), an informal agreement had been reached with the EEA that the countries had a legal obligation to report to the Convention – i.e. to MED POL – which would convey the data to EEA/EIONET, and certain monitoring agreements had been thus reviewed. But other EU member countries continued to communicate their data to the EEA for domestic reasons, and MED POL did not wish to impede the operational flow of data, and approved the valid formula/mechanisms that had been found for all countries. Strictly according to the law, an international instrument such as the Barcelona Convention held sway over a regional agreement.

76. The delegate of Italy pointed out that her country sent its data to EEA/EIONET, by APAT (NRC for EEA) whose database and forms were more detailed and that, if those data were sent to MED POL, they would be diminished in that the Italian monitoring programme was more extensive than that required by MED POL. She knew of no practical solution to the problem for the time being, but also felt a suitable compromise needed to be found. The delegates of Slovenia and Cyprus confirmed that their countries sent their data to MED POL, which subsequently transmitted it to the EEA after a data verification procedure was applied in cooperation with the countries. In 2004, special queries had been developed within the MED POL Database in order to export the data in the required EIONET data tables and the relevant data were submitted using them. The EC delegate said that the data should first go to the body to which they offered added value and that there should be no perceived rivalry between MED POL and the EEA, both of legitimately sought data.

77. Before going on to the agenda item on MED POL-Phase IV, together with three new presentations by experts, Ms. Beken read out a set of conclusions, mostly contained in the working document, along with others reflecting the discussions of the first three days of the current meeting. The Chairperson and the Secretariat agreed that a copy of those conclusions would be distributed to all participants, giving them time to examine them, and make any amendments following the debate on MED POL-Phase IV. Other conclusions on eutrophication were also being drafted.

Agenda item 6: Organization of MED POL-Phase IV monitoring activities

78. The MED POL Coordinator presented document UNEP(DEC)/MED WG.282/4, entitled "Preliminary examination of monitoring and assessment of MED POL Phase IV". The brief document was aimed solely at inciting an initial brainstorming session on the operational aspects of MED POL -Phase IV, on the basis of three recent developments. The first was the evaluation of MED POL-Phase III, an extremely far-reaching exercise whose conclusions and recommendations were to be taken into account. The second concerned the initial results of the implementation of the Strategic Action Programme (SAP MED), which ushered into the region an era of effective collective pollution reduction, along with specific deadlines. The third was that of political and scientific developments at the regional and international levels, in particular the recommendation made by the Contracting Parties to MAP and MED POL to apply the ecosystem approach to the management of human activities. The three Presentations about to be made were intended to outline the new context in which MED POL would be expected to act, focusing on its Mediterranean vocation.

The thematic marine strategy of the EU

79. Mr. Gert Verreet, Environment Directorate General, European Commission (EC), outlined the background to the "marine strategy package" adopted by the Commission on 25 October 2005, which included a communication, a directive and impact study of the costs and advantages of the various options contemplated. The Strategy was needed owing to the growing pressures exerted on the marine environment, knowledge gaps, divergences in the approaches to monitoring and assessment Europe-wide, and the lack of governance around the world, in the EU and in each country. The aim was to obtain a satisfactory state of seawaters in the EU by 2021, by tackling the main problems through

four fundamental approaches: European-regional, ecosystem, knowledge-based and via cooperation. It could be better specified by also referring to a rationalized approach based on four main marine regions – NE Atlantic, Baltic, Mediterranean and Black Sea (2007) – to grasp the main difficulties faced. That regionalization of the approach implied that management measures at EU level would be lacking but that a strategy would be operational and implemented regionally. Mr. Verreet mentioned that the Strategy would be implemented in tandem with the yet-to-be-framed European maritime policy. He detailed the aims of the Working Group on European Marine Monitoring and Assessment (EMMA), and the activities concerning the guidelines on eutrophication and the monitoring of chemical contaminants.

Application of the ecosystem approach to the management of human activities in the marine environment of the Mediterranean.

80. Mr. Civili recalled that application in MAP as a whole – and, therefore, in MED POL – of the concept of the ecosystem approach had been officially adopted by the Contracting Parties at their November meeting. Consequently it was no longer a purely theoretical approach but a concrete measure to be implemented. Moreover MED POL had received from the EC a subsidy of 80 000 euros earmarked for a project aimed at formulating, on behalf of MAP, and for the entire MAP system, the road map for the application of the ecosystem approach.

81. Mr. Alexandre Lascaratos, UNEP/MAP Consultant and Professor of Physical Oceanography, Department of Applied Physics, Laboratory of Meteorology and Oceanography, University of Athens, outlined the process leading to the concept of the ecosystem approach and its introduction since the early 1990s. It was currently regarded, above all, as a management tool, relying on a solid scientific knowledge of the ecosystem proper but it had also integrated a good many concepts concerning the management of human activities with an impact on the ecosystem. The approach had been given the seal of approval at the Biodiversity Convention COP 2000 and by the conclusions of the Johannesburg Summit in 2002. The complexity of the approach was reflected in its myriad definitions. It needed to be applied at every step, at the regional, national and local levels; ecoregions were the smallest geographical zones to which operational ecological objectives would apply, in accordance with six-stage adaptable management, inherent to the concept. For each operational objective, indicators and associated points of reference needed to be worked out. A provisional roadmap of the application of the ecosystem approach provided, in the first instance, for the selection of a test region (e.g. Adriatic). With regard to the Mediterranean, the approach should be implemented in conjunction with the European Marine Strategy, to be made operational through the regional conventions. It had been adopted for the whole of MAP, but MED POL had been chosen to introduce it in the programme.

82. During the extensive discussion that ensued, the interpretation of the ecosystem approach gave rise to numerous observations and suggestions. One participant noted a contradiction between conservation and sustainable use, proposed in one of the definitions, while another wondered whether all earlier data would be re-evaluated. Another supported Adriatic as a first test region. Another detailed a conception of the approach according to which its elements already existed in the Barcelona Convention and all actions carried out by MAP for years, in SAP MED and SAP BIO, with management tools, well defined issues, noted in all countries, known corrective measures, but what was lacking was the exact knowledge of what needed to be protected in relation to the

ecosystem, taking into account all the factors at stake – including the social and economic ones. Another expressed the feeling that the MED POL was still at an early stage in the understanding and application of the approach. Consequently, as a final resort, an adjustment or general tuning was called for. Ecosystems did not all work on the same scale, and first their limits needed to be set to define the ecoregions and adjust the activity, precisely one of the aims of the project that MED POL would be developing with the EC over the coming biennium. Marked similarity had also been noted between the ecosystem approach and integrated management of coastal zones; yet the latter faced considerable difficulties in dissemination and application, in particular owing to conflicts of interest and uses, and the ecosystem approach would also take years to enter in the mindsets and actual practice, but it would be necessary to strive towards that. Another participant noted the similarity with the SAP. Mr. Lascaratos acknowledged that no limits had been set between some of those interpretations but that the ecosystem approach ought not to be confused with an eco-region approach, in that eco-regions were geographical units to which the ecosystem approach would be applied, which meant that all countries that were parties to the Convention would be involved in a joint action with more emphasis on the sustainable aspect. Most of the components of the approach were already in place, but the main challenge for the future would be to forge links between them.

Guidelines on eutrophication: assessment of eutrophication in the framework of the European water policies

83. Ms. Kaliopi Pagou, National Centre for Marine Research (Greece), presented the activity on eutrophication launched by the EU in the context of the application of its Marine Strategy and Water Framework Directive, in order to harmonize the assessment methods and criteria, to harmonize the models of predicting loads of nutrients of natural or human origin, and to proceed to a systematic identification of sources of nutrients and of procedures of rehabilitating water masses. That activity was conducted by a group of European experts, a Steering Group presided by the Commission and a technical Secretariat, with the mandate of producing a document of guidelines on the modalities of assessing eutrophication, of comparing the various definitions and interpretations of the phenomenon Europe-wide and of proposing a new conceptual framework for its assessment in all water categories and policies. Ms. Pagou offered an insight into the current methods and criteria for assessing the risk of eutrophication for the different water masses, and cited examples of the procedures in force, such as that of OSPAR. She also presented an indicative list of the general and categorical characteristics of the impact of eutrophication on rivers, lakes and seawater, both transitional and coastal. Finally, she provided a comparative table of the results of assessment carried out under various directives and policies.

84. Mr. Civili pointed out that, in the new general context of Phase IV, just outlined by the previous speakers on the European policies and the ecosystem approach, it was now necessary to return to the two fundamental obligations of the LBS Protocol", i.e. the systematic evaluation of pollutant levels, to take into account the results and shortcomings of Phase III detected in the MED POL assessment and to ensure that, in the future, the geographical coverage of the region would be complete; and to assess the efficiency of the plans, programmes and measures adopted. For that, it would be necessary to turn to the national authorities, urging them to continue to negotiate the monitoring programmes. MED POL had received a good level of responses from countries that had not officially taken part in the Phase III monitoring programme – namely Spain, France and Italy. But they also needed to fill in the gaps through the organization of sub-regional contamination

surveys, a solution that had been examined and adopted at the previous meeting of national coordinators, albeit a burdensome task requiring coordination. With that in view, an IFREMER expert would be making Presentations and the Secretariat would be proposing a roadmap.

85. Mr. Bruno Andral, Environment Resource Laboratory, Provence Côte d'Azur Corse (LER/PAC), Ifremer Centre de Méditerranée (France), highlighted the advantages of sentinel organisms in the biomonitoring of trace contaminants since they concentrated the contaminants in their flesh in proportion to their bioavailability, thereby reflecting the mean contamination of the sea. From that viewpoint the mussel was internationally recognized as an integrating species that tolerated sharp variations in the environment, was easy to identify and collect, and presented a factor of concentration of 10^3 to 10^5 . Two strategies for its use were under way: passive biomonitoring of wild or farmed mussels ("mussel watch"), or active biomonitoring using the transplantation of replicas from a single sample. France's national monitoring network (RNO) had started on its Mediterranean coast the passive biomonitoring of a whole series of inorganic and organic contaminants and active biomonitoring (RINBIO) using the implantation for a period of around three months of sexual rest of *Mytilus galloprovincialis* in a plastic bag, 20-30 metres off the coast to detect heavy metals, DDT, DDD, DDE, PCB, PAH and radioelements. In 2003, there were 103 RINBIO stations with a 98% recovery rate.

86. Mr. Andral then explained the application of the method of active biomonitoring in the framework of the European programme INTERREG III/MEDOC "Mytilos" programme launched by IFREMER, in cooperation with ICRAM (Italy), IEO (Spain), PTST (Region of Sicily), IMEDA (Balearics) and CSIC (Catalunya), in order to obtain a snapshot of chemical contamination all around the western Mediterranean. Contacts had been made with the countries of the Maghreb for the Mytilos 2006 campaign. Another "Mytimed" project consisted in completing "Mytilos" to obtain a snapshot of chemical contamination around the Mediterranean using a standardized protocol that enabled the variability of results due to the different trophic conditions of Mediterranean waters to be reduced. Another 120 stations would be needed in addition to the 140 Mytilos stations. The project concerned Greece, Turkey, Sicily and Malta (Mytimed Medoc), Lebanon, the Syrian Arab Republic and Tunisia (Mytimed Meda). It was also supported by UNEP/MAP-MED POL, which had been involved in the project as observer. A dossier, being prepared by the EC, provided, under the aegis of MED POL, for the completion of a roadmap by two complementary campaigns in the Adriatic and in the southern Mediterranean (Israel, Palestinian Authority, Egypt and Libya).

87. The Secretariat drew the meeting's notice to the provisional "roadmap" (2005-2010) of the Mytilos-Mytimed project, contained in annex I of the document on Phase IV, UNEP (DOC)/MED WG.282/4. There would be funding from MED POL, but the project would mainly rely on external revenue.

88. While welcoming the ambition, scope and considerable interest of the Mytilos and Mytimed Projects, several participants expressed concerns at the possible problems caused by transplanting *Mytilus galloprovincialis* to those zones of the eastern Mediterranean from which it was absent: its three month lifespan might be reduced owing to stress during growth or to greater accumulation of contaminants. The introduction of an allochthonous species invariably presented ecological risks. The patella might be a possible substitute, but it ought not to be forgotten that it was a very different organism, namely a gastropod that fed on hard substrata. Mr. Andral pointed out that *Mytilus* had been

transplanted to oligotrophic sites in the western Mediterranean where the species did not exist, but that its growth and survival had not been affected. Nevertheless he did not rule out the possibility that in that part of the Mediterranean, a preliminary pilot study could be carried out to decide whether to implement the project, as requested by one participant.

89. Regarding the modalities used for gathering and notifying data, Mr. Andral said that the Mytilus/Mytilimed data belonged to the project partners and it was incumbent on them to provide a statistical classification and a snapshot of the contamination that was clear and of use for decision-makers. One participant remarked that the CIESM used a similar initiative to "mussel watch"; Mr. Andral replied that it only referred to radioelements and it had therefore proved difficult to integrate it or coordinate it with Mytilos/Mytilimed. The representative of QUASIMEME insisted on the need for data obtained at various project stations to be comparable.

90. The MED POL Coordinator addressed the second main obligation under Article 8 of the LBS Protocol, namely the assessment of the effectiveness of pollution reduction plans, programmes and measures. An examination of the sub-regional surveys clearly revealed that they were costly in human and material resources (cruises, etc.) and could only provide indirect information for a regional assessment of effectiveness of the policy measures. On the national and local levels, the trend monitoring component had been well thought out, as had been compliance monitoring, the list of hot spots and its regular review. A stronger link needed to be forged between the national authorities and industries. The new addition, however, was the SAP, starting with the NBBs, which had first been established by all the countries by 2003, and would be recalculated every five years, with a reporting system that would gradually be integrated into the reporting system of the whole of the MAP. Did the participants think that, for Phase IV, the classic monitoring activities should be maintained or gradually replaced by those of the SAP, for example, by one NBB to be redone every three years?

91. Some participants first emphasized that the data as they stood fell short of requirements, especially when it came to the monitoring of rivers and other water courses, whose frequency needed to be increased, to agricultural runoff, to certain social and economic factors such as the use of pesticides, and to more specific areas such as remote-sensing in the perspective of the ecosystem approach. Two delegates argued in favour of maintaining the combined classic-MED POL/SAP approach, without making it a dilemma; another asked for emphasis to be laid on strengthening the SAP with a view to implementing the NAP, in the framework of the objective of de-polluting the Mediterranean by 2020. One expert proposed that the SAP be gradually integrated along with the LBS Protocol, by means of a joint management instrument that could be developed using the funds available for the ecosystem approach.

92. The Secretariat said that some kind of consensus seemed to have emerged in favour of maintaining both types of activities while determining the right synergies for their mutual complementarities. The aim of MED POL monitoring and that of SAP were not the same. Compliance monitoring was carried out with reference to national regulations on routine measures, while in the SAP some 25 substances were covered, with specific deadlines set. In the case of the NBBs, vital for monitoring the reductions in pollution over the years, estimates were made by means of emission coefficients and should be gradually replaced by effective measures.

93. With regard to the monitoring of rivers, an issue already raised by participants, Mr. Civili pointed out it too was provided for in the Protocol and that, in accordance with the principles of MED POL-Phase IV adopted by the Parties in Portoroz, it was proposed that it should be made compulsory in estuaries; it was only when the latter seemed to constitute a "hotspot" that the countries would be called upon to carry out monitoring in the river concerned in order to pinpoint the pollution sources. It was also obvious that very few countries had a programme for quantifying river inputs and that the issue called for an examination of its possible inclusion in Phase IV, along with that of diffuse sources via the rivers, whose extent needed to be analysed.

94. One expert proposed that the monitoring of rivers should first be carried out on two or three test-case rivers for which sufficient data already existed for use in a model, and that the results should be extrapolated to other rivers. Similarly, the monitoring of diffuse sources could rely on models, in particular for atmospheric deposit, while another expert added that it required data on farming practices (use of pesticides, etc.) and of farm products. Another felt that the best way to monitor part of the pollution due to diffuse sources (mainly agricultural ones) was to monitor the quality of river water.

95. The Secretariat distributed to the participants the new version of conclusions as they had been reworded in the light of the latest discussions, with the addition of a paragraph on eutrophication. The meeting had meticulously revised, amended and expanded those conclusions, to be found in **annex III** of the present report. The Secretariat pointed out that a draft report of the meeting reflecting the discussions, with only a short summary of the Presentations, would be sent to participants for approval and any remarks. A CD containing all the Presentations *in extenso* would be sent to them at an earlier date.

Agenda item 7: Other business

96. Nothing was raised under this agenda item.

Agenda item 8: Closure of the meeting

97. Following the usual courtesies, the Chairman declared the meeting closed on Thursday, 15 December at 12.40 p.m.

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ANNEX II

AGENDA

1. Opening of the meeting
2. Election of Officers
3. Adoption of the Agenda and Organization of Work
4. Review and analysis of MED POL Phase III monitoring activities (1996-2005)
 - 4.1 Participation and coverage of MED POL III Monitoring Programmes
 - 4.2 Evaluation of compliance monitoring activities
 - 4.3 Evaluation of site-specific temporal trend monitoring activities
 - 4.4 Evaluation of coastal water monitoring activities
 - 4.5 Evaluation of Data Quality Assurance Activities
 - 4.6 Evaluation of the ongoing monitoring of loads
 - 4.7 Biological effects monitoring: Evaluation of pilot activities
 - 4.8 Monitoring of eutrophication: Evaluation of pilot activities
 - 4.9 Review of revised sediment monitoring strategy
 - 4.10 Conclusions for MED POL Phase III
5. MED POL Information System
6. Organization of MED POL-Phase IV monitoring activities
 - 6.1 Monitoring and Assessment in application of the LBS Protocol
 - 6.2 Monitoring and assessment in the framework of ecosystem approach to the management of human activities and in accordance with other international initiatives
7. Other Business
8. Closure of the Meeting

ANNEX III

CONCLUSIONS

1) The strategy related to compliance monitoring has to be revised to make this type of monitoring an even better tool for the implementation of the provisions of the LBS and Dumping Protocols, as well as the SAP.

2) The trend monitoring should continue following the same course as in MED POL Phase III, taking into account the recommendations of the 2nd and 3rd review meetings of monitoring activities which were based on precise data analysis.

The next step could be to analyze the results (information on trends) for each monitoring site and establish links with the available information on inputs, as well as the measures taken to reduce pollution.

3) Data should be gathered to estimate the magnitude of pollutant inputs 1) via rivers/streams and 2) from diffuse sources arriving directly to the sea. This activity should be considered essential in view of the provisions of the LBS Protocol.

Modelling of inputs from watersheds could also be considered a useful tool for understanding the transport of substances to the coastal waters of the Mediterranean.

4) In order to understand better the contribution of atmospheric deposition of substances to the pollution of the marine ecosystem, data and previously published work from different regions of the Mediterranean should be reviewed.

5) The biological effects monitoring activity should be further developed considering the 2-Tier approach, taking into account the use of caged organisms.

The activity should continue to be a component of MED POL monitoring and assessment as an early warning tool for the effects of pollutants at the molecular/organism level.

6) Pilot eutrophication monitoring studies at local problem areas should continue to be implemented based on the short-term strategy which supports the TRIX index and phytoplankton determinands.

After the results obtained from pilot programmes are collected, they should be evaluated against the validity of use of TRIX in different Mediterranean areas.

The draft document, "MED POL Eutrophication Monitoring Strategy: update report and proposal for new indicators", is of strategic importance and, in the light of the suggestions made by the meeting, has to be revised to integrate better the existing monitoring strategy in future MED POL activities (MED POL – Phase IV).

The suggested acceptance of new benthic ecosystem indicators presented in the document is well in line with the eutrophication monitoring strategy, and is recommended for consideration in future approaches, e.g. the ecosystem approach.

7) Comments and remarks on the strategy and methods for sediment sampling and analysis are expected not later than the end of January 2006. On the basis of the comments received, the text will be improved by the experts and disseminated to the laboratories.

8) The work on Data Quality Assurance implemented by IAEA-MESL for chemical contaminants was considered successful and should continue throughout Phase IV.

DQA for all the other components of monitoring, should also be implemented through other arrangements, including possible contacts with QUASIMEME.

9) The MED POL Secretariat will complete the Phase III database (1996-2005) through the inclusion of comparable data sets (including QC/QA data) and information available from national data sources, as recommended by the last Contracting Parties Meeting. All countries will be asked for such data sets during 2006.

The Secretariat will integrate the available data and information into the MED POL Information System which is being developed in cooperation with, and with the support of, INFO/RAC.

Moreover, the Secretariat will publish the overall findings of the monitoring activities at the regional level for the period covered by MED POL Phase III. The major goal of this effort is to prepare an assessment of the state of pollution of the coastal waters of the Mediterranean during this period in accordance with Article 8 of the LBS Protocol. The product will obviously include all data and results of all the countries available to MED POL. The work will be achieved by the Secretariat through consultations with national/regional experts and IAEA-MESL.