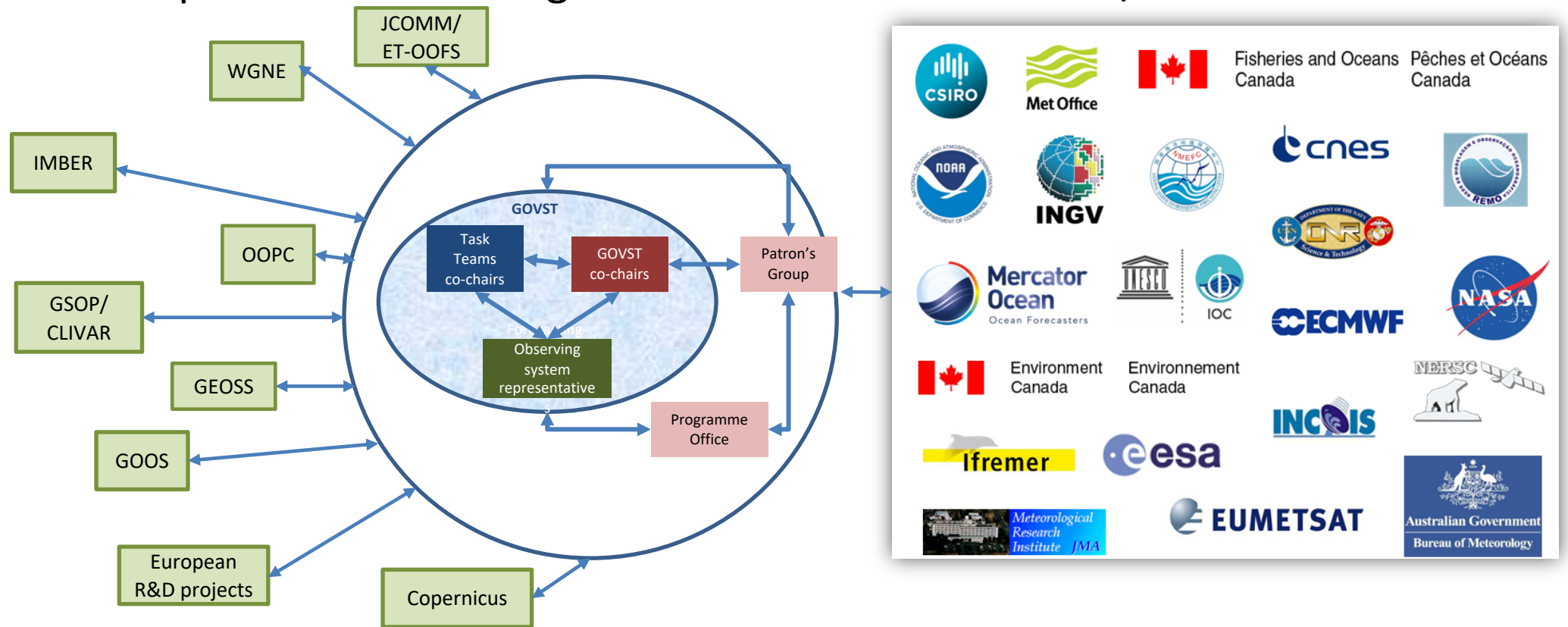**OCEANPREDICT**

Advancing the science of ocean prediction

Scientific development, implementation, validation, and exploitation of operational ocean forecasting systems

OceanPredict - an International Programme

"OceanPredict is inherently an international endeavour": It provides a platform for international collaboration which is being integrated with parent bodies (patrons), international research programs and research initiatives related to ocean analysis and prediction including those within WCRP and IOC/WMO.

GODAE - OceanPredict

The vision

Development of a global system of observations, communications, modelling and assimilation to provide regular, comprehensive ocean forecasts & analyses for maximum benefit of society

The plan

Improvement and exploitation of operational ocean forecast systems for societal benefit, sustaining and enhancing of the global ocean observing system, and integration with the international ocean community

Scope and Objectives

→ **Support the development of new operational systems**

Foster and coordinate the **development of new** ocean monitoring, modeling and assimilation systems

→ **Promote access to data products**

Promote **access to data and information products** and enhanced uptake of ocean analysis and forecasting products

→ **Facilitate operationality**

Support the transition from the demonstration of new services based on ocean forecasting to the **provision of timely, robust and reliable operational services**

→ **Demonstrate the value of ocean observing systems**

Demonstrate the value of ocean observing systems, in order to ensure access to a sustained real-time and high-quality ocean observing system, and liaise with major observing system agencies, programs and science teams on observing system issues.

Ocean prediction

→ **Three components:**

- **Observations:** Remote sensing (ea surface height, temperature), floats (Argo), and in-situ (XBTs, moorings)

- **Numerical model**

- **Data assimilation**

→ **Current state of the art global ocean prediction systems**

1/12° global (1993-present reanalysis and forecasts) – 8 km grid spacing at the Equator, 6 km at mid-latitudes – reolsution to double in 2019.

→ **Model outputs easily accessible via THREDDS servers**

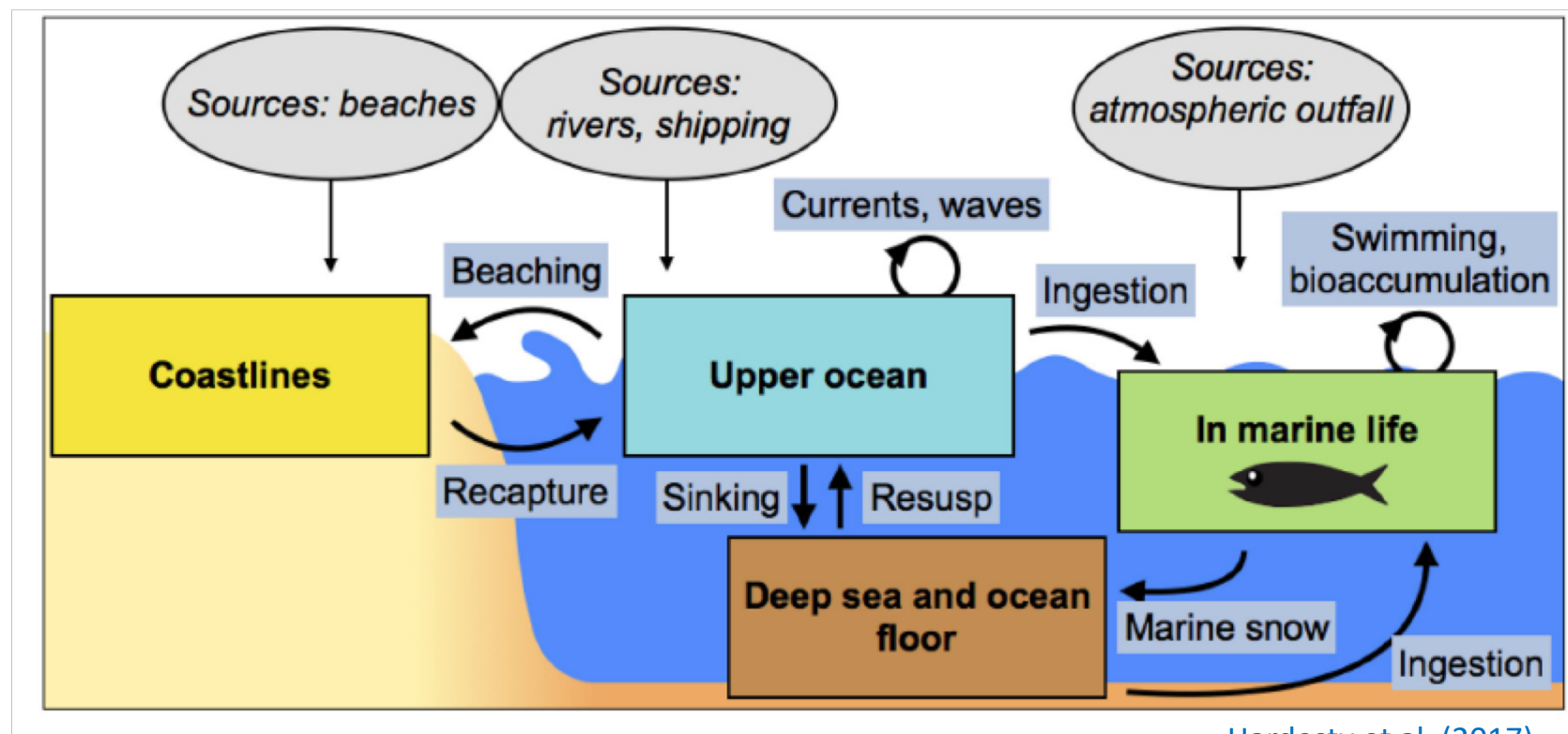# Using numerical models and ocean forecasts to improve our understanding of microplastic distribution

→ **Microplastics can be modeled as a tracer**

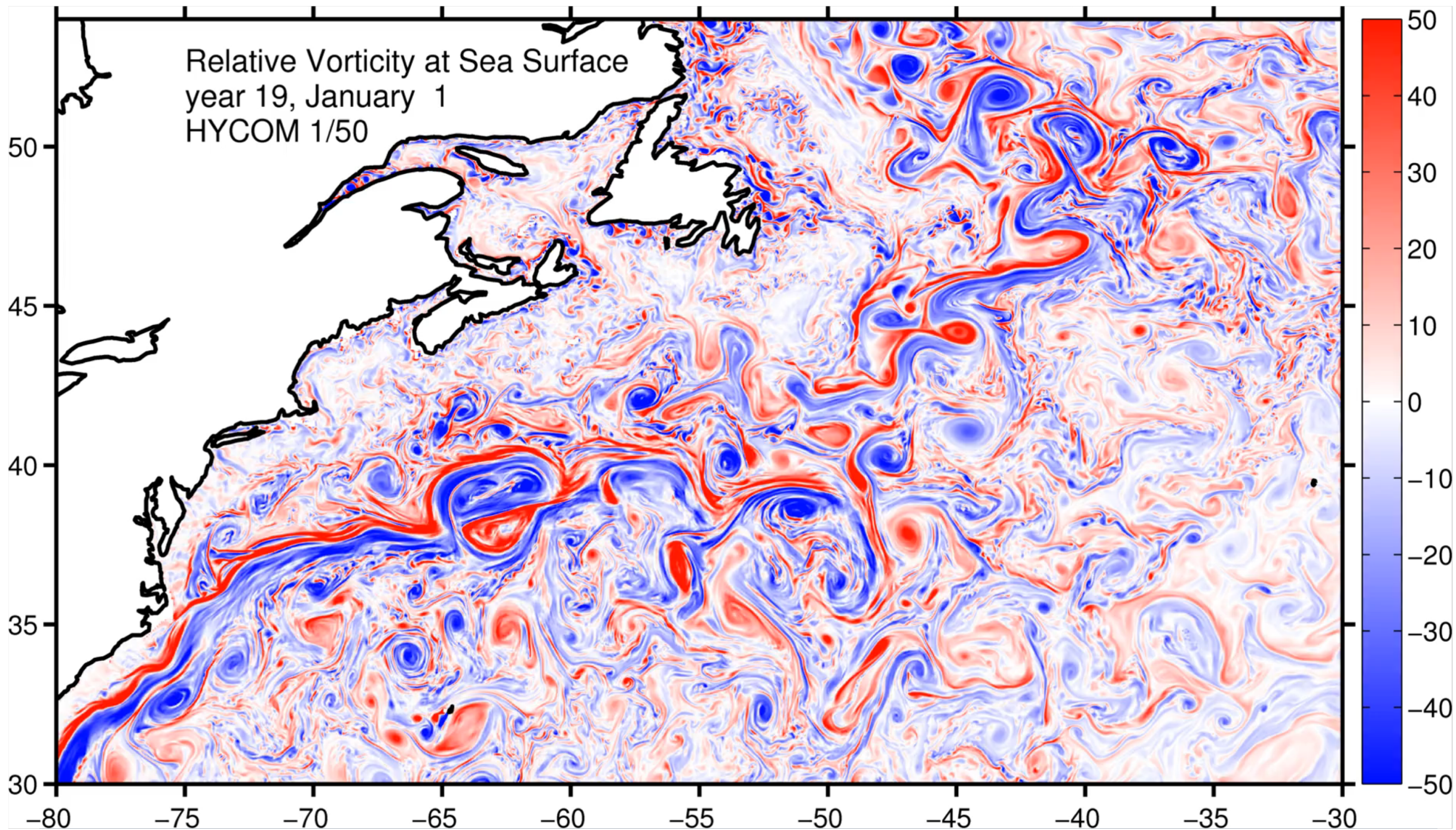microplastic counts [#/km², log10 scale]
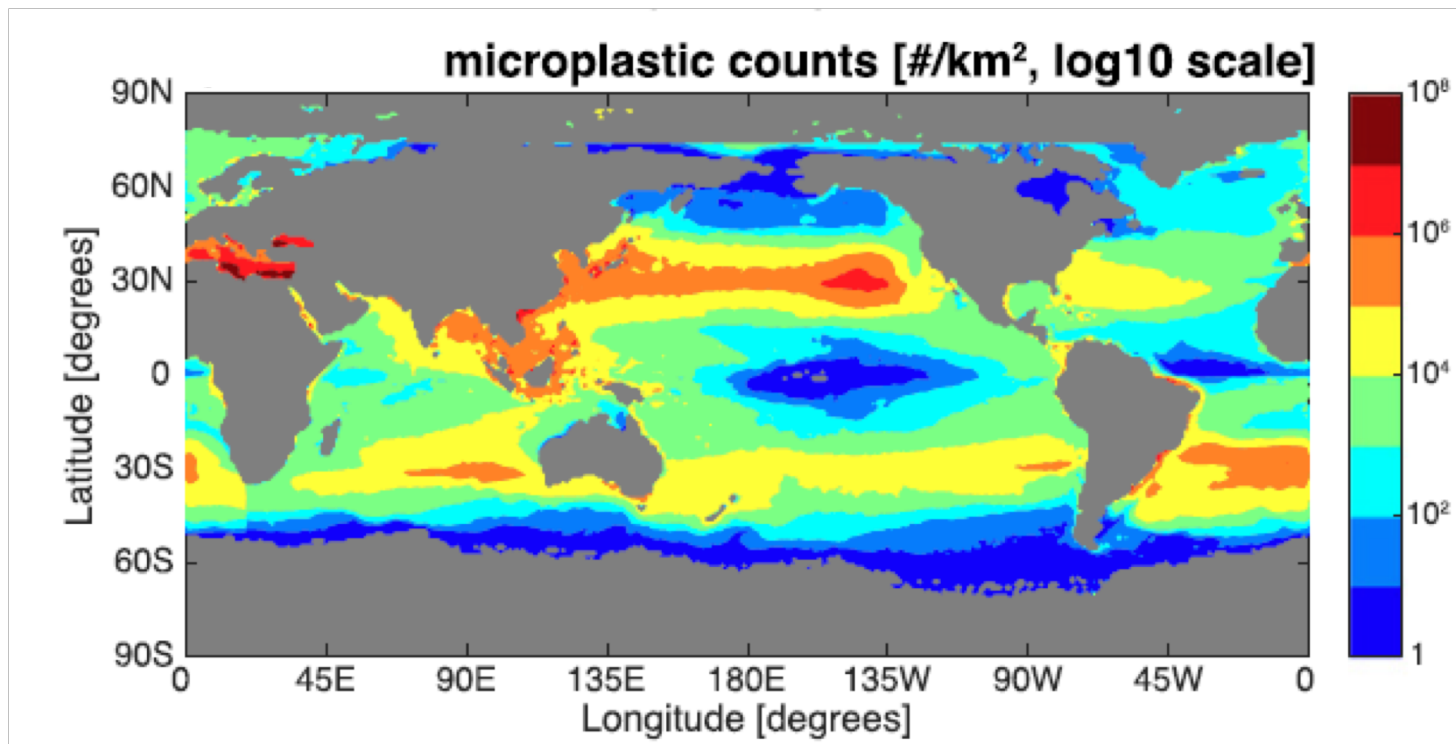
Van Sebille et al. (2015)

Uncertainties

→ **What are the main contributing sources of plastic in the ocean?**

→ **What is the fate of plastic in the ocean?**

→ **Model errors**

Hardesty et al. (2017)

Relative Vorticity at Sea Surface
year 19, January 1
HYCOM 1/50

Recommendation

→ **develop the underpinning science and tools to eventually enable full integration of microplastics (simplified at first) in <u>existing physical operational systems</u> => implies working closely with relevant national and regional systems**

→ **improvement of the observing systems (key to initialize the models)**

→ **modeling of the essential life span of microplastics**

Strong analogy with the modeling of phytoplankton and fisheries – similar limitations (for exemple, lack of observations and in depth knowledge of NZPD interactions) –another analogy would be oil spill modeling

"The ability to predict areas of plastic input and deposition would enable the identification of at risk species, and it would allow for efforts to reduce and remove plastic debris at targeted locations. The current uncertainty as to the effects of global warming on our oceans is the greatest challenge in predicting the future patterns of plastic aggregation in relation to global circulation."

Welden and Lusher (2017)