

# Mapping global mining activities using open Earth observation data

---

Dr Victor Maus

Institute for Ecological Economics

Vienna University of Economics and Business

[victor.maus@wu.ac.at](mailto:victor.maus@wu.ac.at)

[vwmaus.github.io](https://vwmaus.github.io)

UNODC and UNEP, Apr 19, 2023, Vienna

**Currently, there is not enough geospatial information available to conduct comprehensive sustainability assessments for mining**



# Earth observation is the only viable data source for monitoring mining areas



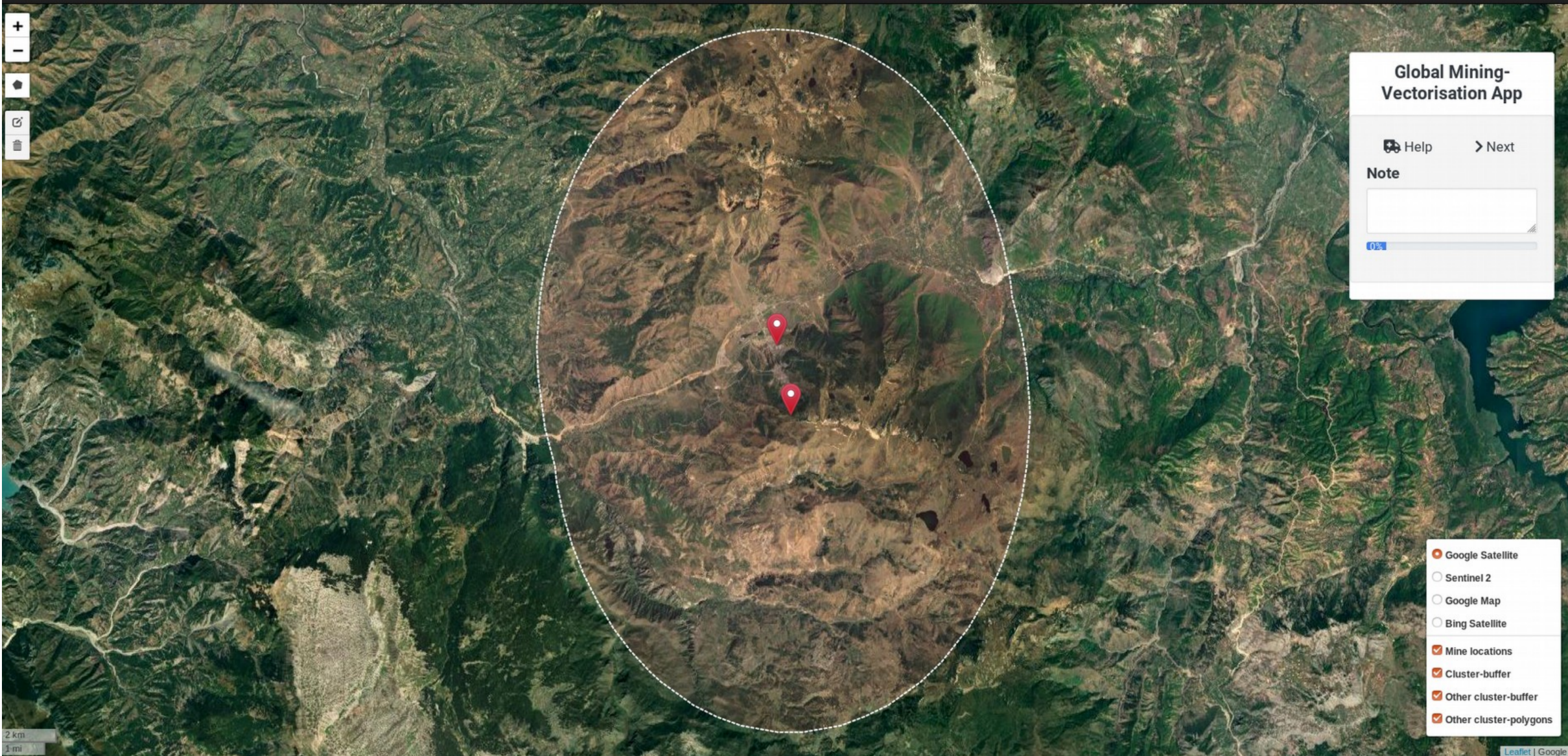
# With little training, humans can identify mining in satellite images

## Open cut of the Carajás Iron Mine, Brazil



## Gold mining in Kayapo indigenous territory, Brazil





### Global Mining-Vectorisation App

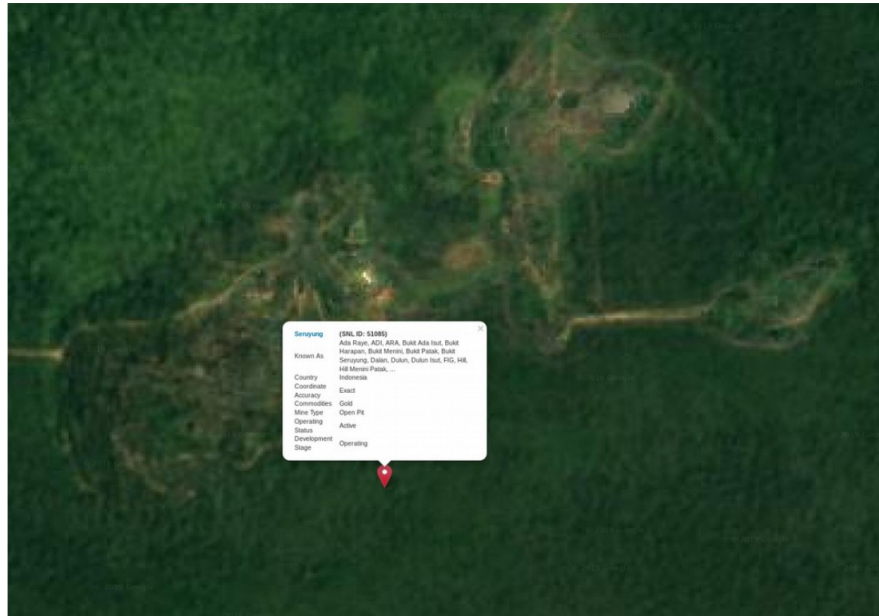
Help > Next

Note

0%

- Google Satellite
- Sentinel 2
- Google Map
- Bing Satellite
- Mine locations
- Cluster-buffer
- Other cluster-buffer
- Other cluster-polygons

Google

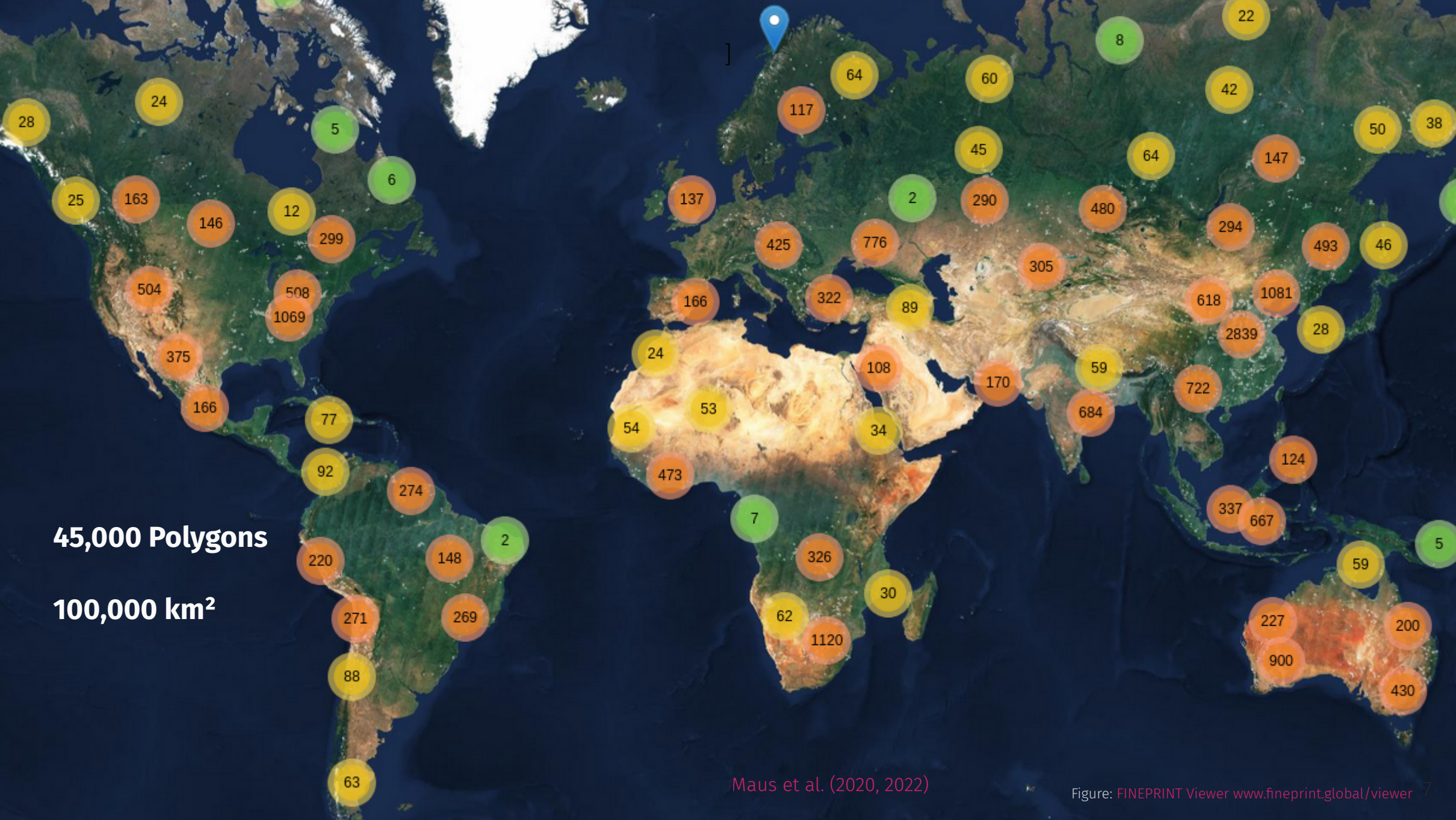


Bing



Sentinel 2

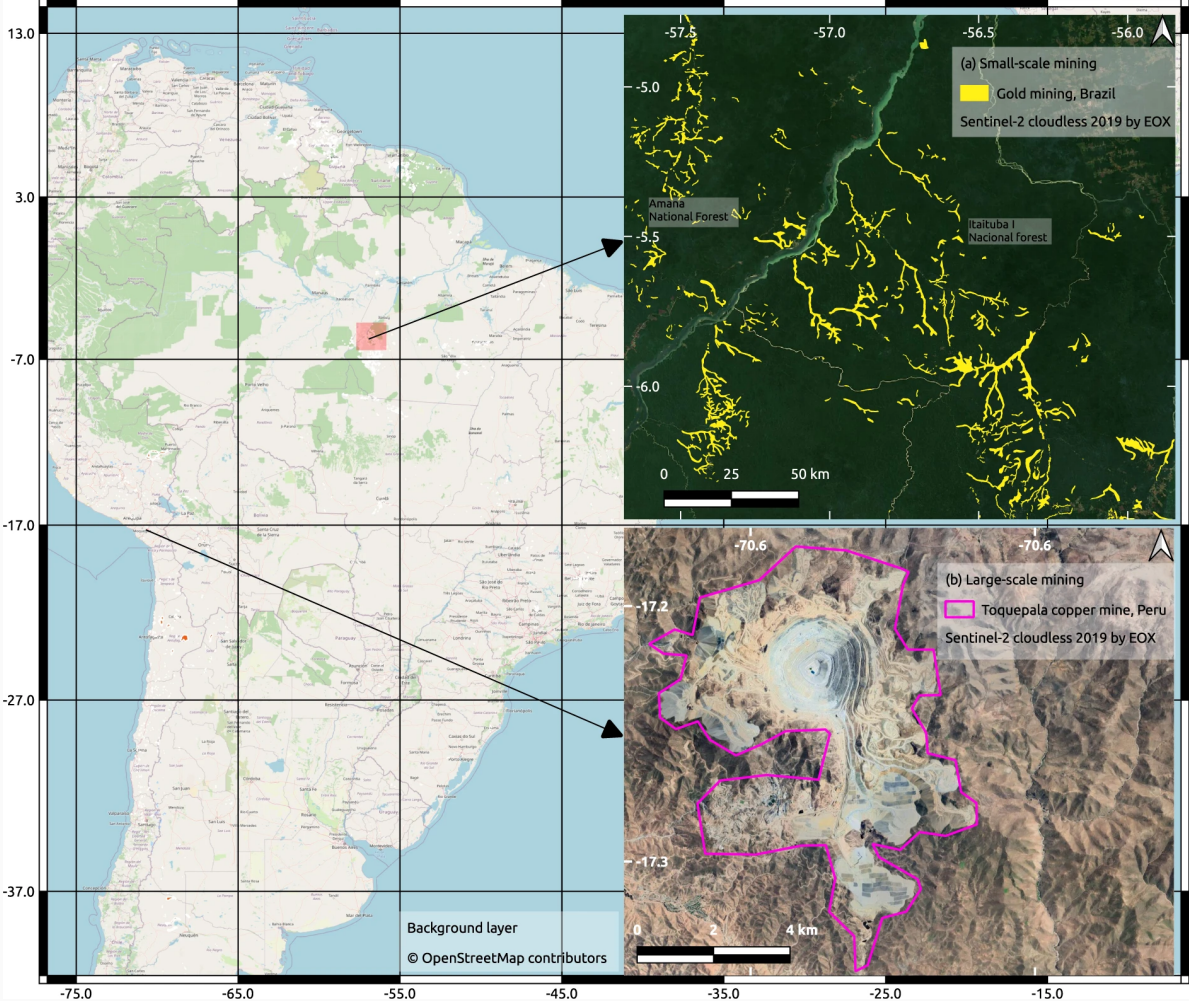




**45,000 Polygons**

**100,000 km<sup>2</sup>**

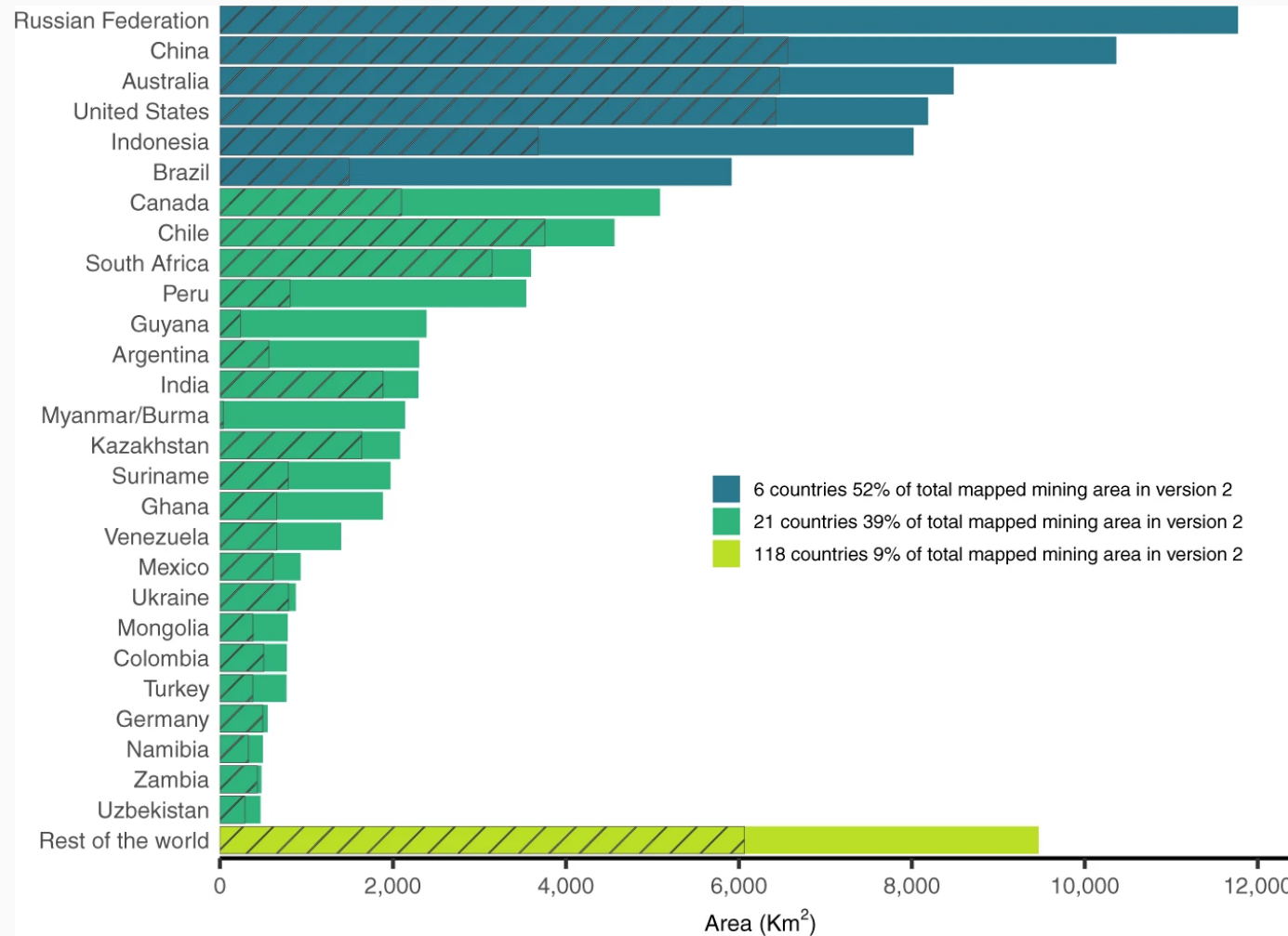
# The database includes industrial mining as well as small-scale artisanal mining globally



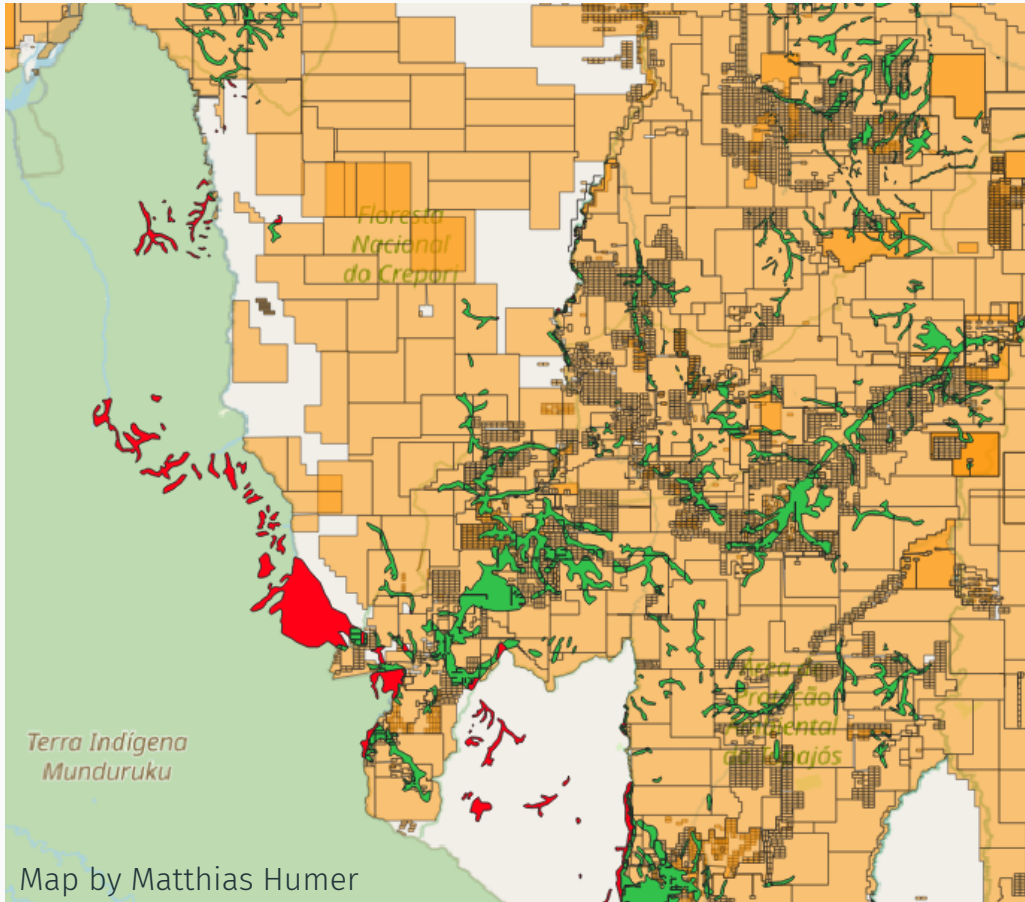
Maus et al., 2022



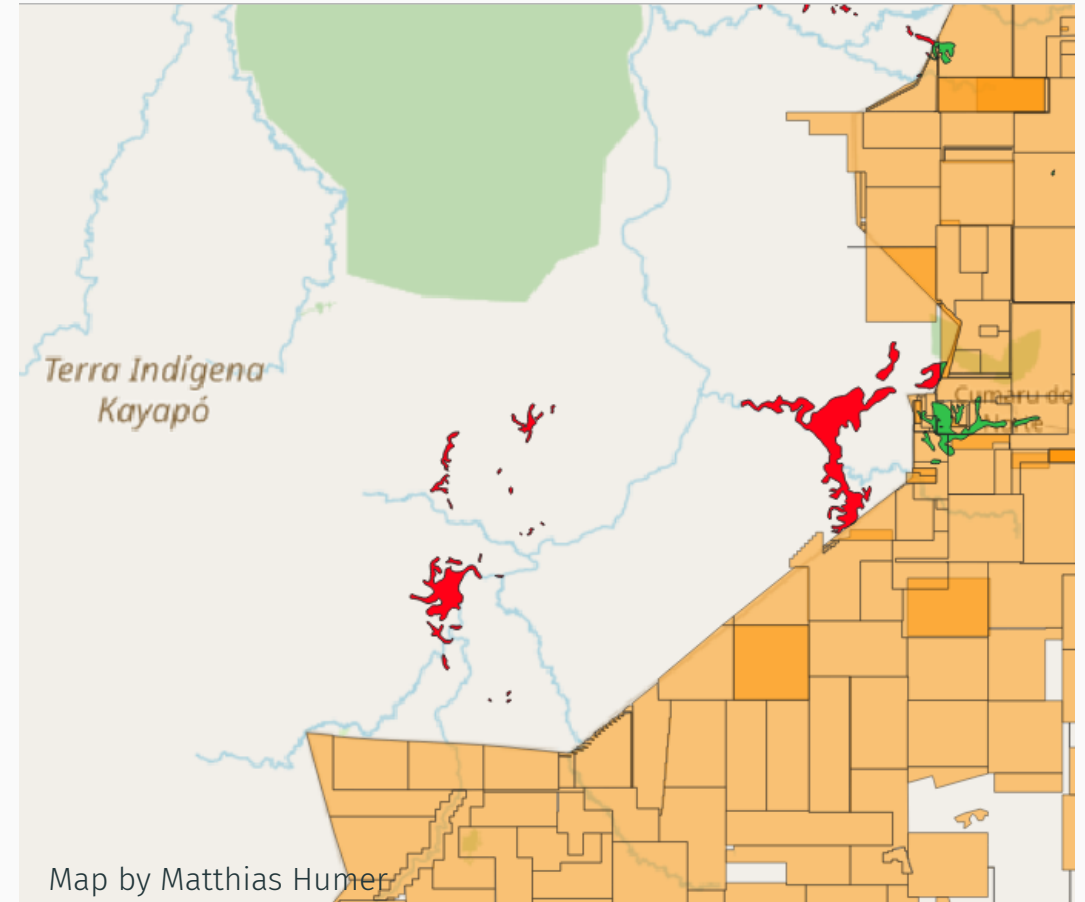
# Mining land use distribution across countries



# Mining in indigenous land in Brazil

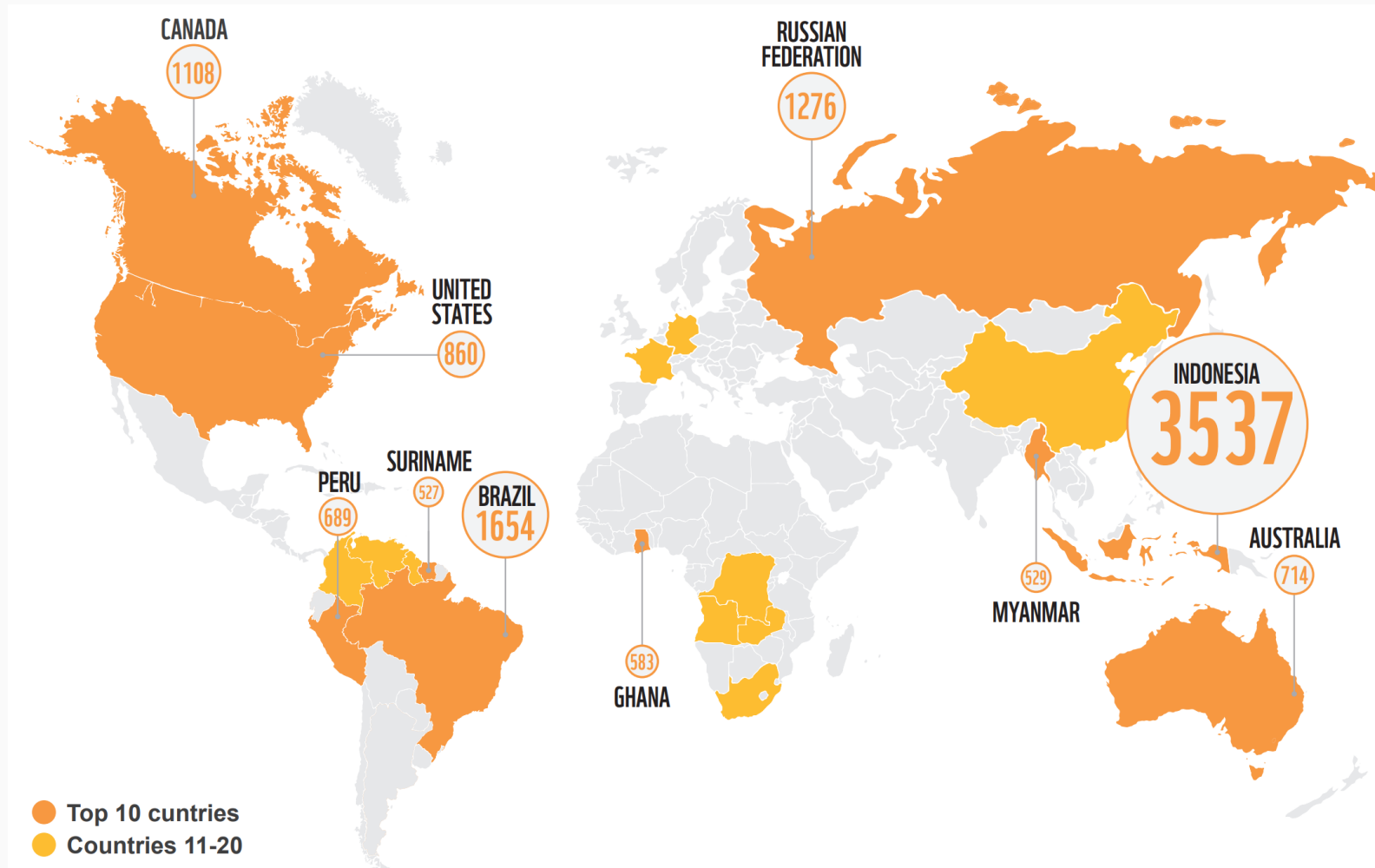


**Munduruku indigenous territory, Brazil**



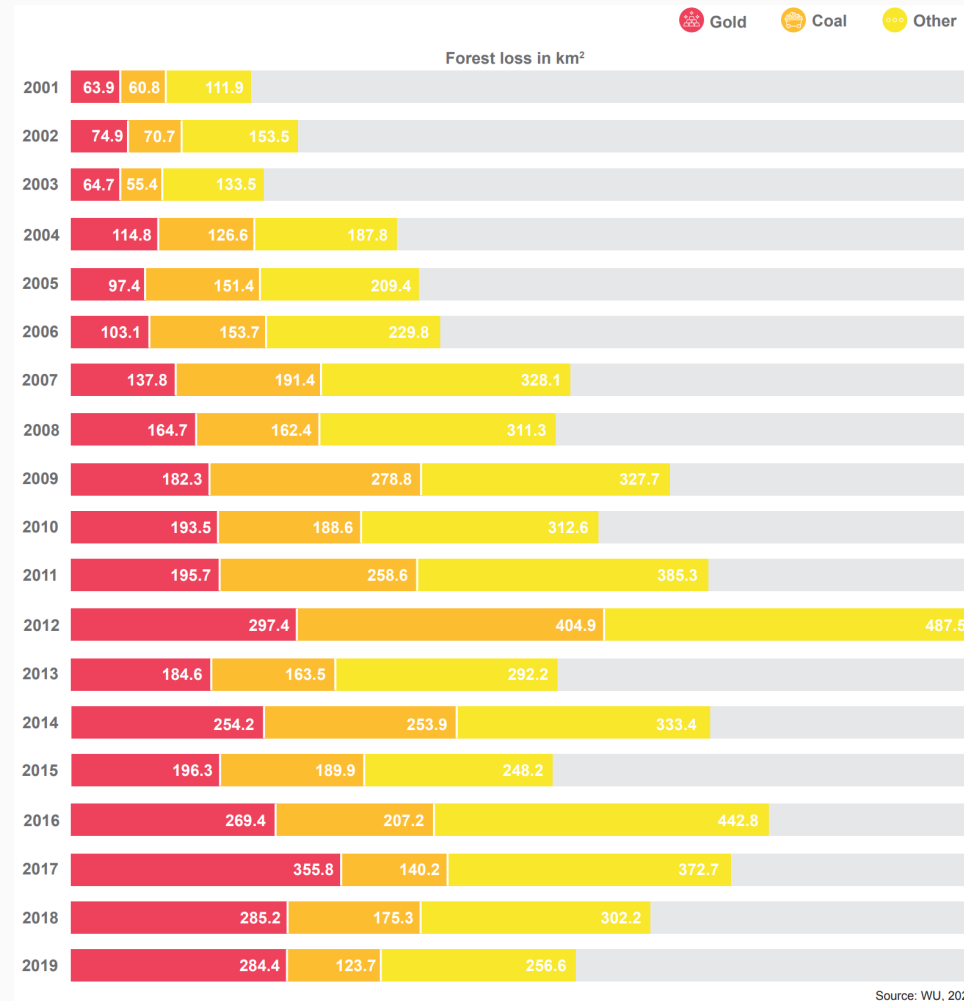
**Kayapó indigenous territory, Brazil**

# Mining-related forest loss by country accumulated from 2001 to 2019



Kramer et al., 2023

# Mining-related forest loss by commodity, 2001-2019

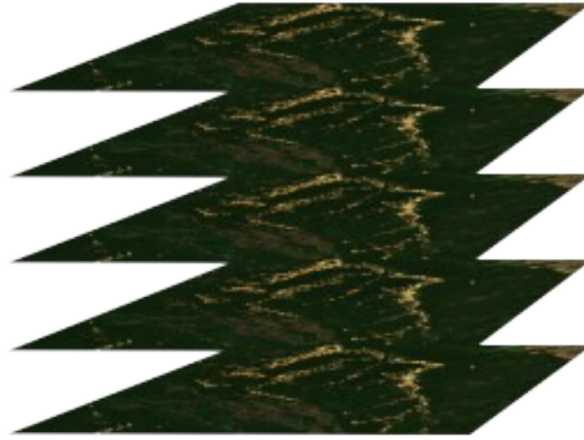


Kramer et al., 2023

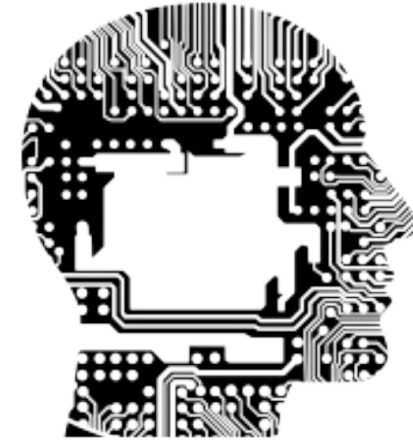
Labeled data



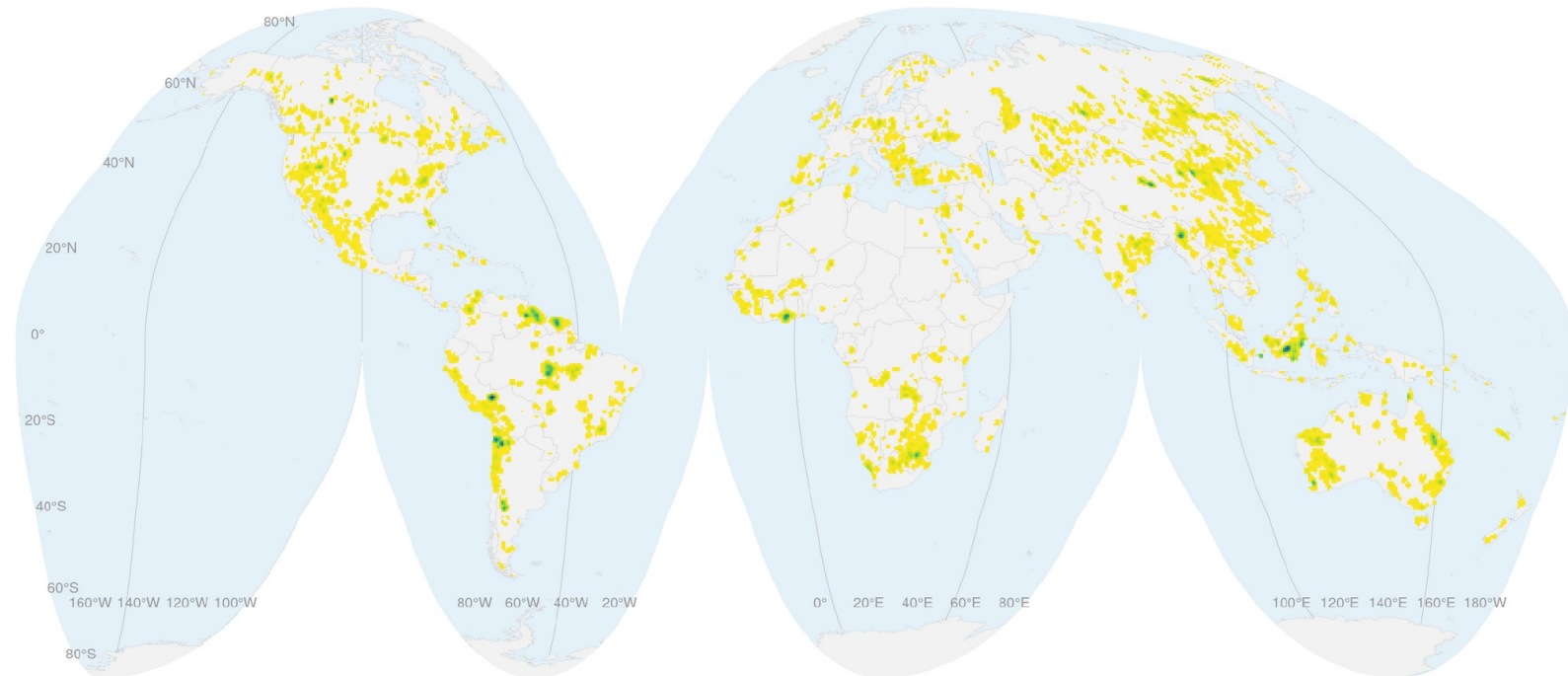
Observations



Algorithm



**Towards monitoring legal/illegal mining**





Dr Victor Maus  
Institute for Ecological Economics  
Vienna University of Economics and Business  
victor.maus@wu.ac.at  
[wwmaus.github.io](https://wwmaus.github.io)

UNODC and UNEP, Apr 19, 2023, Vienna

Thank you!

