

A world map with a dark blue background, showing a network of white lines representing rivers across all continents. The map is centered on the Atlantic Ocean.

THE OCEAN
CLEANUP

TU Delft

WAGENINGEN
UNIVERSITY & RESEARCH

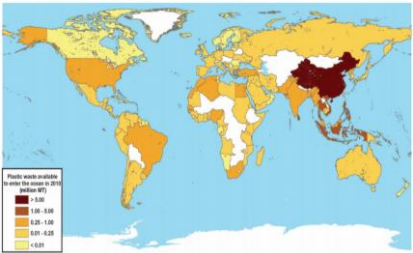
HELMHOLTZ
ZENTRUM FÜR
UMWELTFORSCHUNG
UFZ

Over 1000 rivers accountable for 80%
of global riverine plastic emissions into
the ocean

Lourens Meijer, Tim van Emmerik, Ruud van der Ent, Christian Schmidt, Laurent Lebreton
EGU2020

Building on previous Global Estimates for plastic emissions into the Ocean

2015



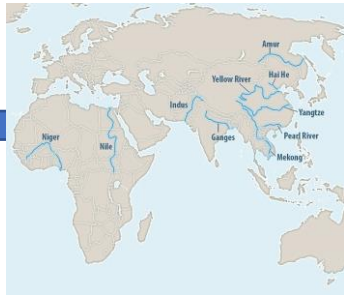
Jambeck et al.

2017



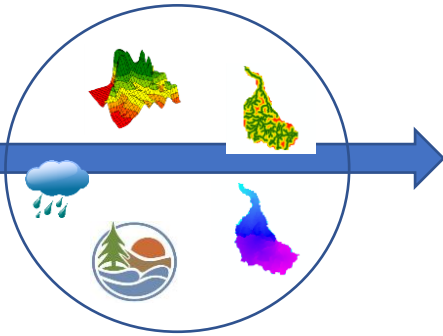
Lebreton et al.

2017



Schmidt et al.

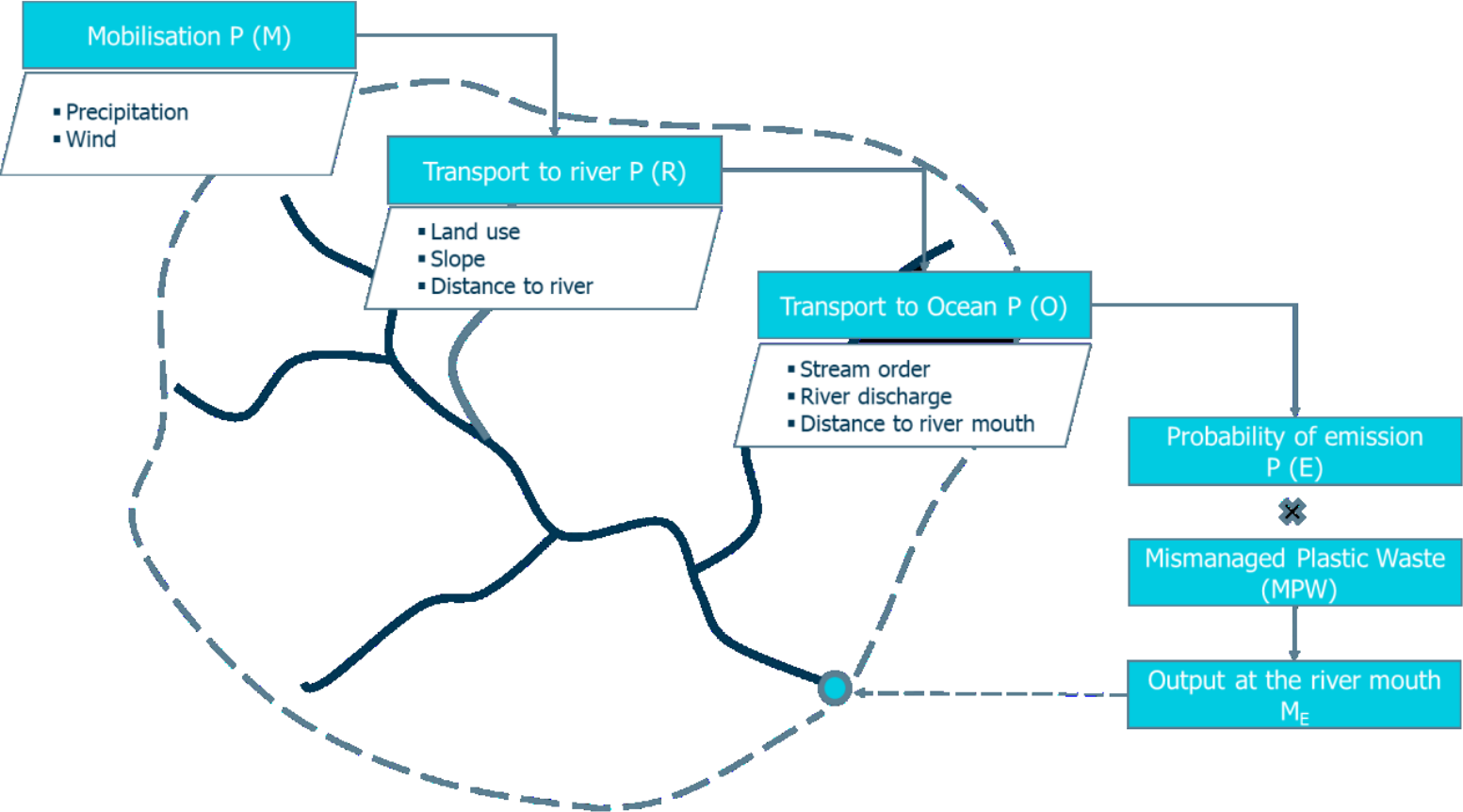
2020



Meijer et al. Pre-Print.

New modelling approach

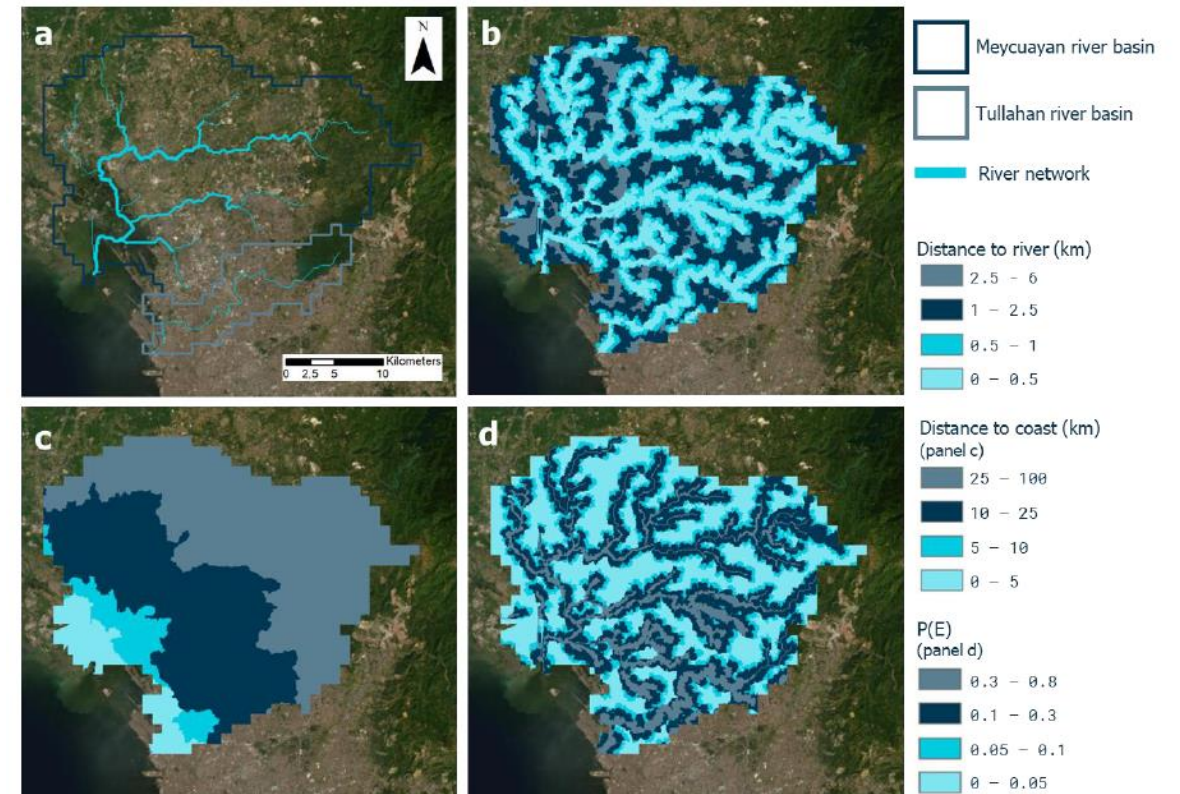
Probabilistic Approach per grid cell (instead of lumped catchment approach)



Impact of considering location of waste and in river basin and differentiate for climate and driving forces between basins

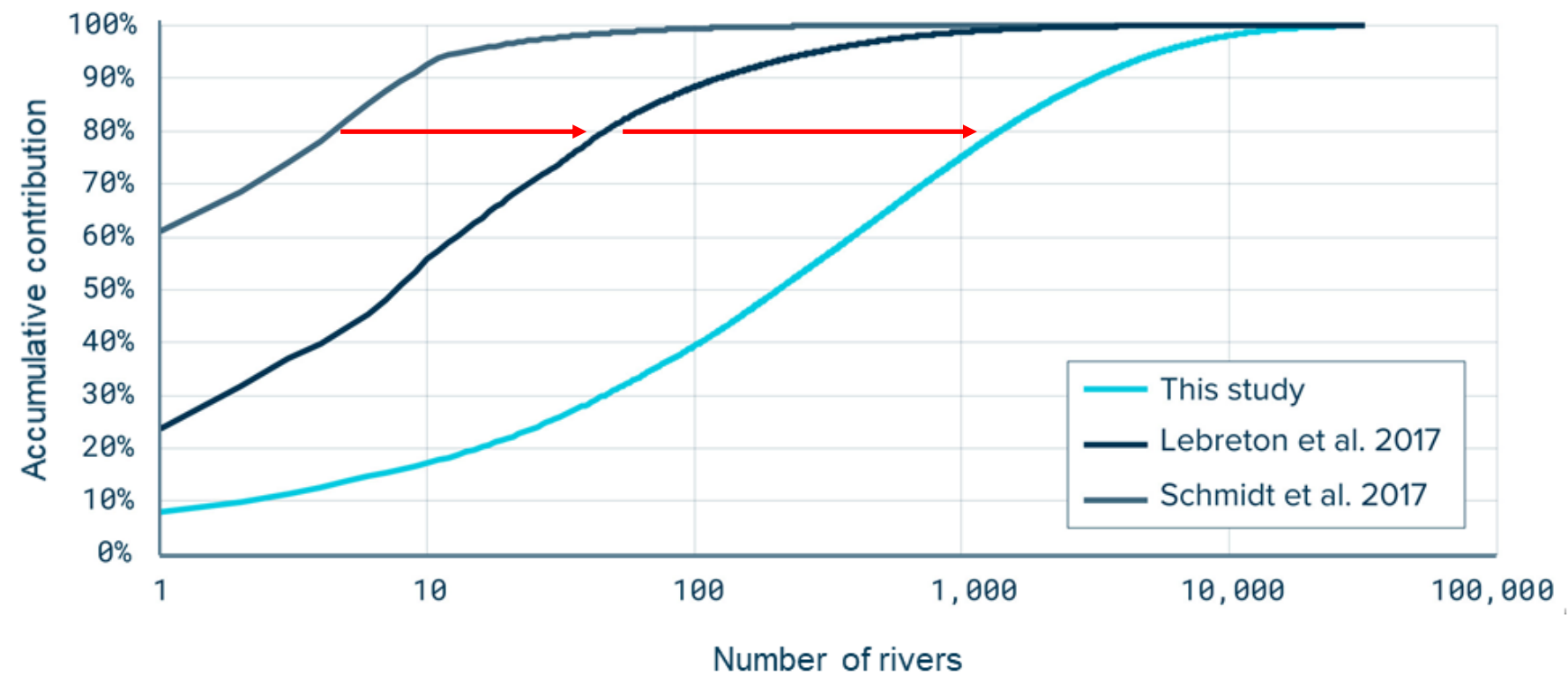
Calculate for global 90m grid;

- MPW Generation [Lebreton et al., 2019]
- Distance to nearest river within catchment
- Distance from river entry to river mouth
- River discharge and width
- Driving and mobilizing forces;
 - Population density
 - Wind
 - Rainfall / Runoff



New modelling approach

Probabilistic Approach per gird cell (instead of lumped catchment approach)



Results

-
- Over 1,000 rivers accountable for 80% of riverine plastic emissions
 - Global riverine plastic emissions distributed over more rivers
 - Not only larger rivers, but also small urban drains amongst top plastic emitting rivers
 - Mitigation efforts required for large number of rivers of very different size and characteristics

Affiliations

Lourens J.J. Meijer^{1*}, Tim van Emmerik^{1,2}, Ruud van der Ent^{3,4}, Christian Schmidt⁵, Laurent Lebreton^{1,6}

¹The Ocean Cleanup, Rotterdam, The Netherlands

²Hydrology and Quantitative Water Management Group, Wageningen University, Wageningen, The Netherlands

³Department of Water Management, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Delft, The Netherlands

⁴Department of Physical Geography, Faculty of Geosciences, Utrecht University, Utrecht, The Netherlands

⁵Department of Hydrogeology, Helmholtz-Centre for Environmental Research – UFZ, Permoserstrasse 15, 04318 Leipzig, Germany

⁶The Modelling House, Raglan, New Zealand

Pre-print access and download: <https://eartharxiv.org/zjgty/>

Status: *Under Peer review*

THANK YOU

