

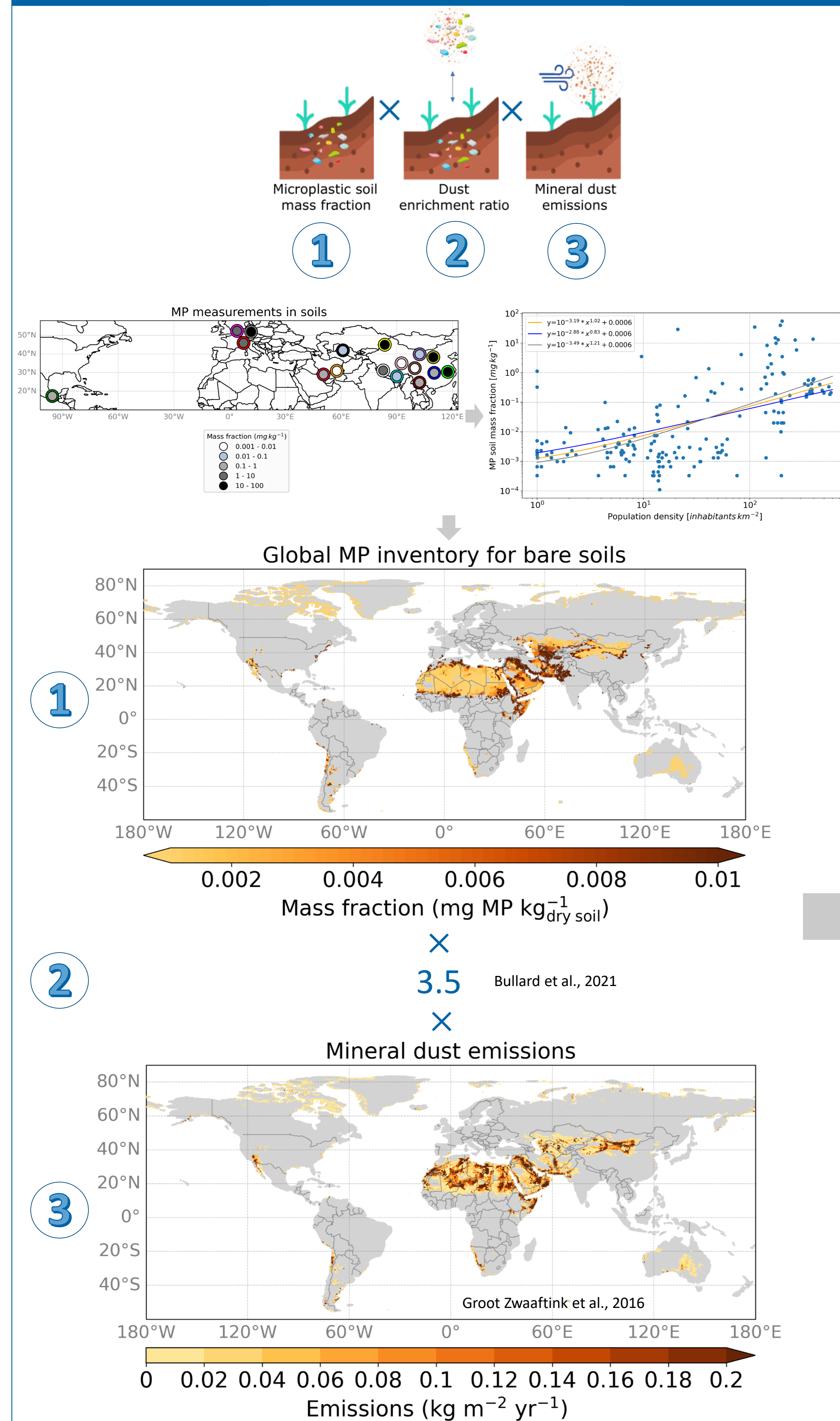
## 1. Motivation and research questions

Microplastics (MPs) are an emerging atmospheric pollutant. MPs are transferred from the atmosphere via wet and dry deposition to terrestrial and marine environments. Then, MPs can be injected into the atmosphere again by resuspension from these habitats. However, research on bare soils, especially from a modeling perspective, lags behind.

This study aims to answer the following questions:

1. How can MPs be resuspended in bare soil regions?
2. What is their atmospheric transport pattern after emission?

## 2. Microplastic resuspensions

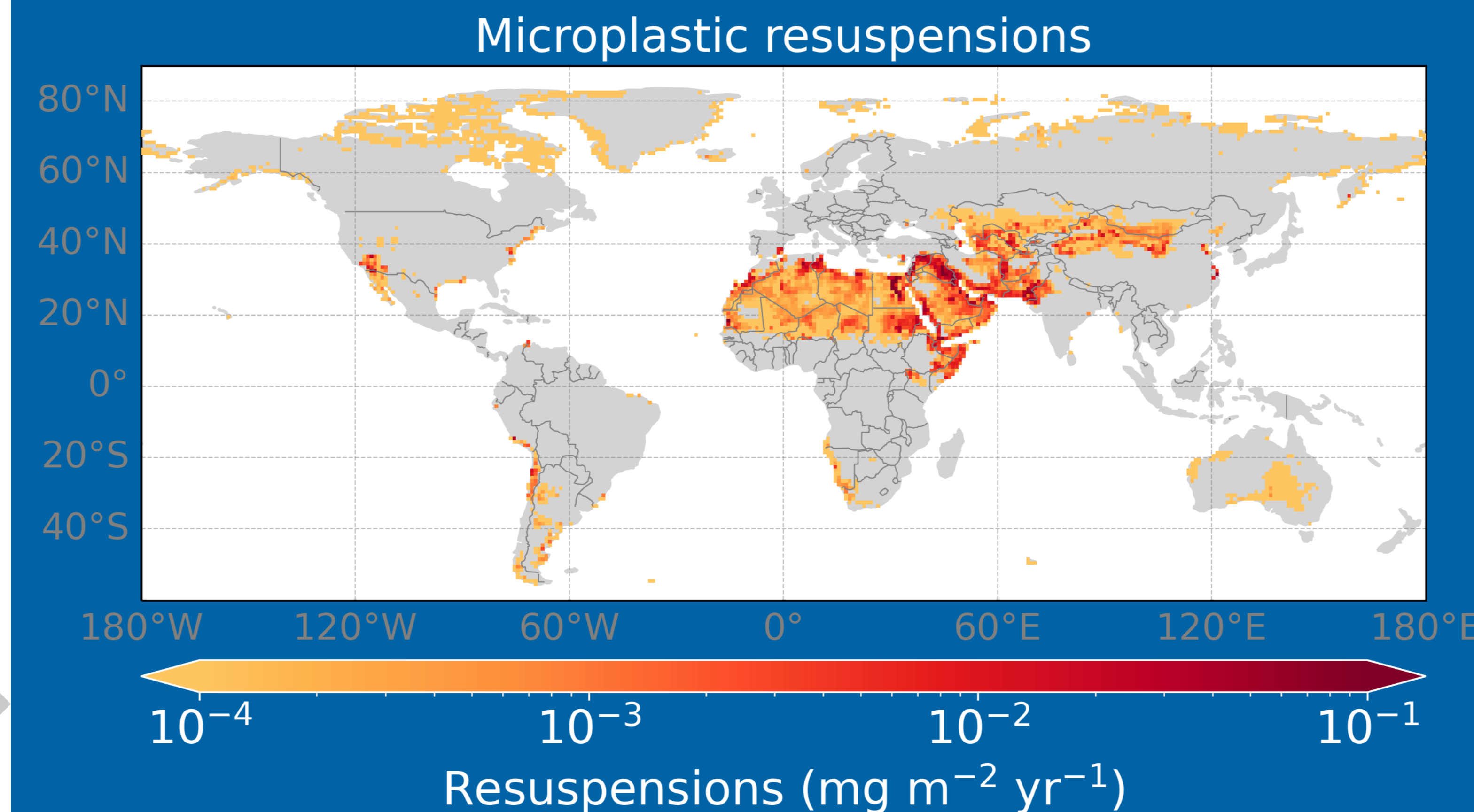


# Microplastic particles resuspensions in bare soils and global atmospheric transport

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**104.4 (47.9 – 109.5) tons of Microplastics are resuspended with mineral dust annually**



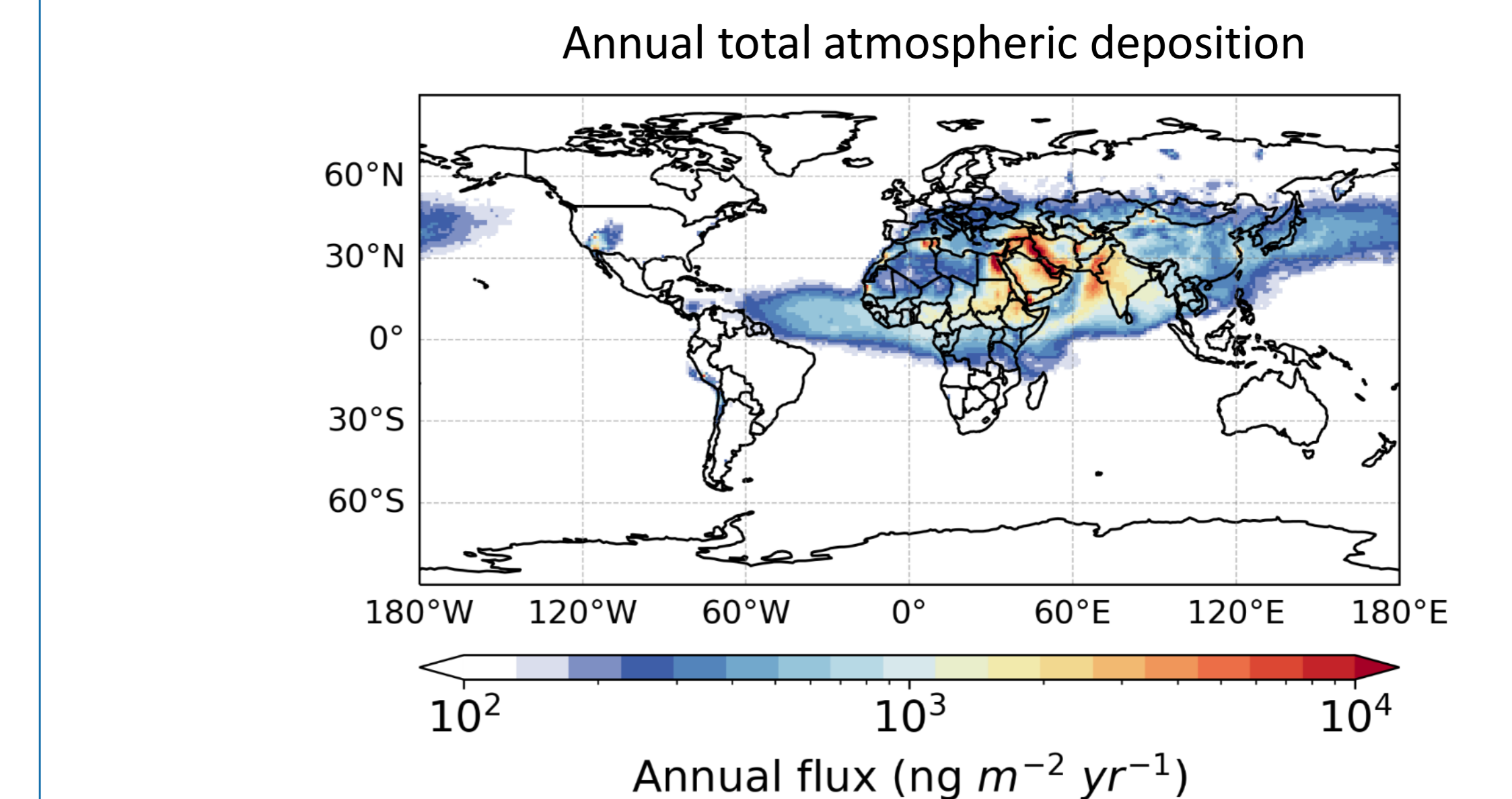
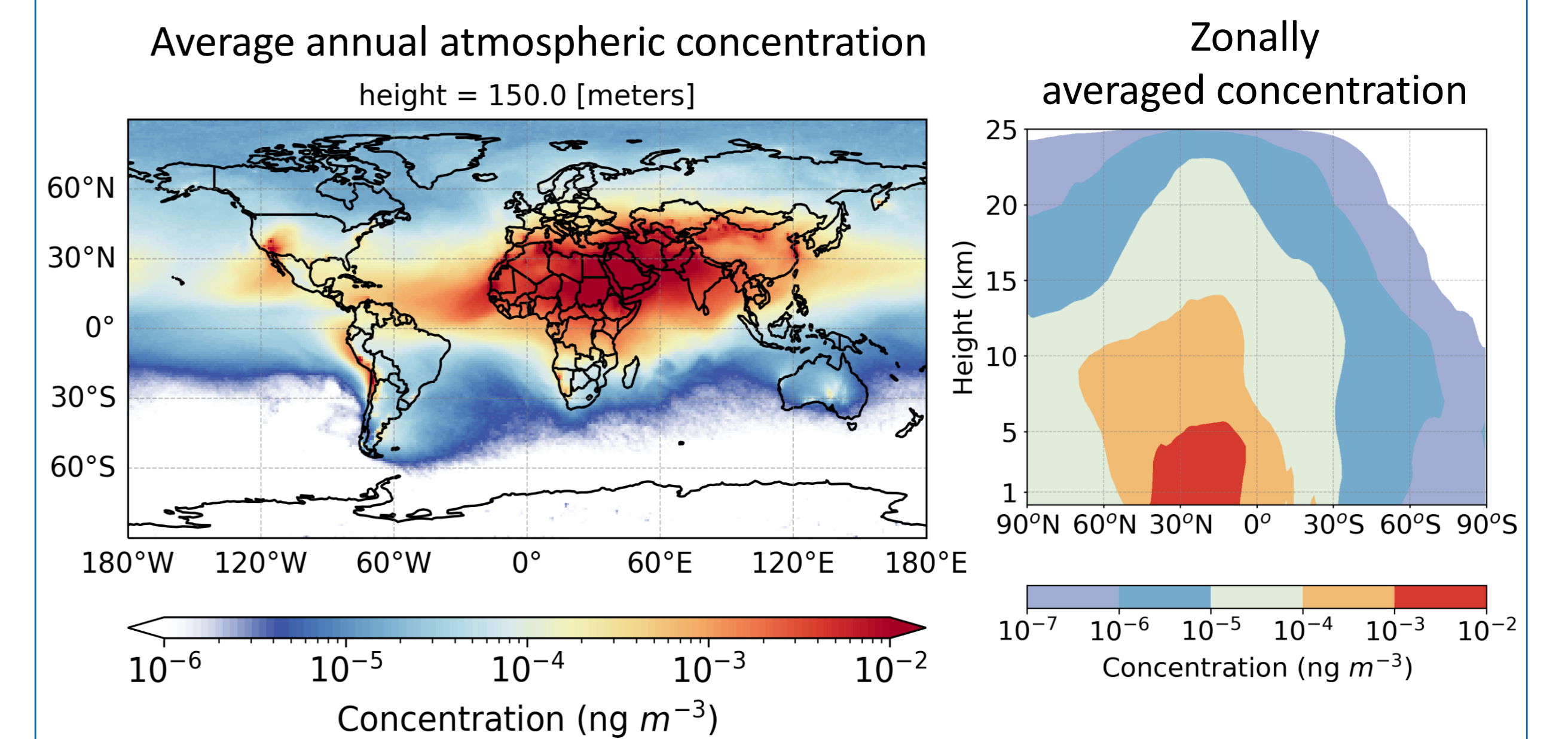
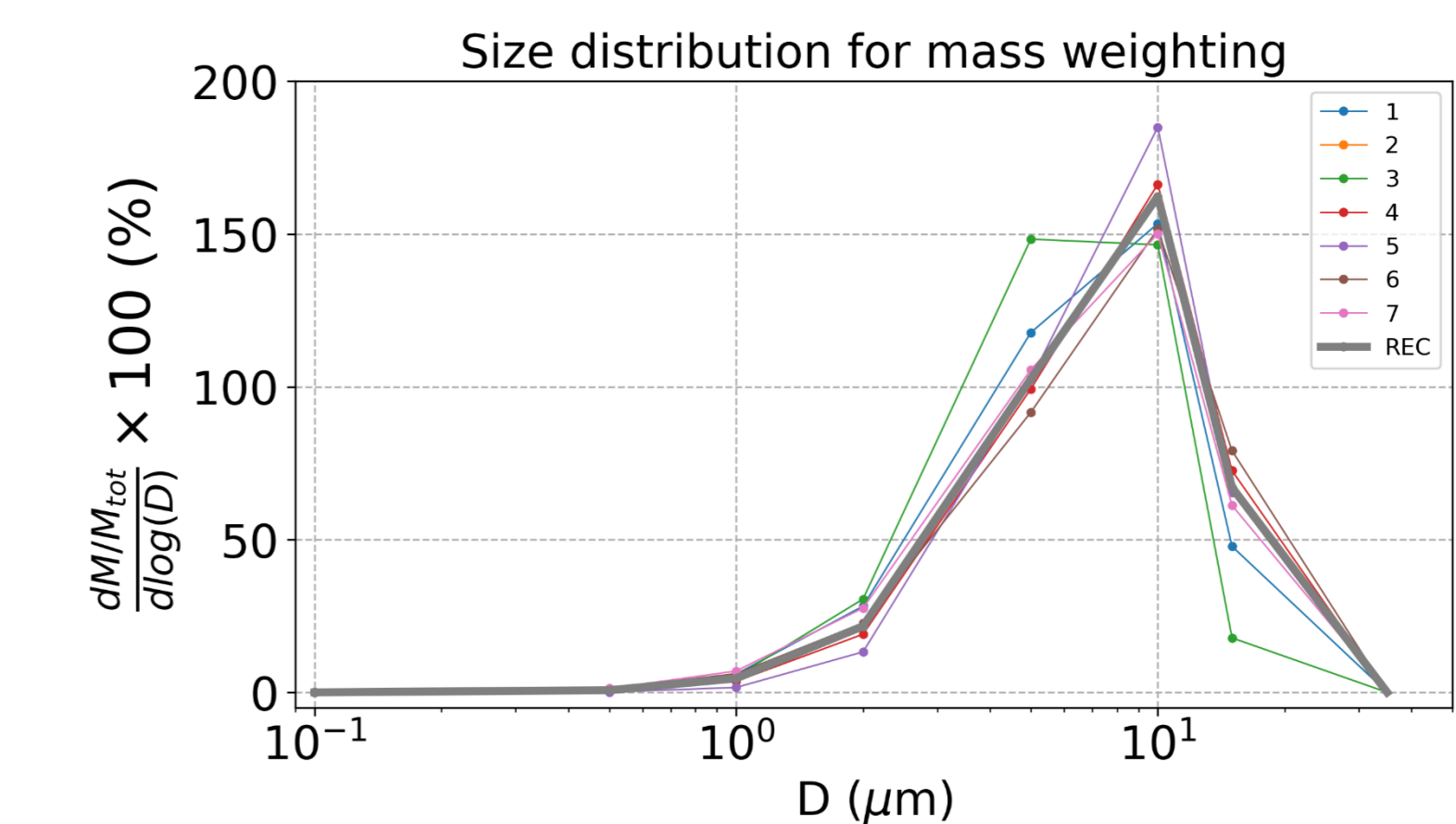
## 4. Take home messages

1. Global MP resuspensions from bare soils: 104.4 (47.9 – 109.5) tons  $\text{year}^{-1}$
2. High atmospheric concentration and deposition near the sources, however global transport, even in remote regions
3. Transport into stratosphere at low latitudes
4. Around 28% of deposition takes place over oceans

## 3. Atmospheric transport

Lagrangian dispersion model FLEXPART (Stohl et al., 1998)

8 particle sizes  
particle shape of fiber (Tatsii et al, 2024)



- Average global atmospheric lifetime is 9 days
- 9.3 (5.4 – 11.2)  $\text{pg m}^{-3}$  over North Africa
- Most of mass in the lower troposphere, but transport to higher altitudes and into the stratosphere occurs at low latitudes
- MPs reach remote regions, such as the Arctic and Antarctic
- 74.8 (43.2 – 82.9) tons of microfibers are deposited on land
- 29.1 (17.5 – 33.4) tons end in the oceans annually

## 6. Reference(s)

Bullard et al., *Atm. Env.*, doi:10.1016/j.atmosenv.2020.118038, 2021  
Groot Zwaaftink et al., *JGR*, doi:10.1002/2016JD025482, 2016  
Stohl et al., *Atm. Env.*, doi: 10.1016/S1352-2310(98)00184-8, 1998  
Tatsii et al., *Env. Scie. Techn.*, doi: 10.1021/acs.est.3c08209, 2024