

Anthropogenic bioavailable supply to global oceans

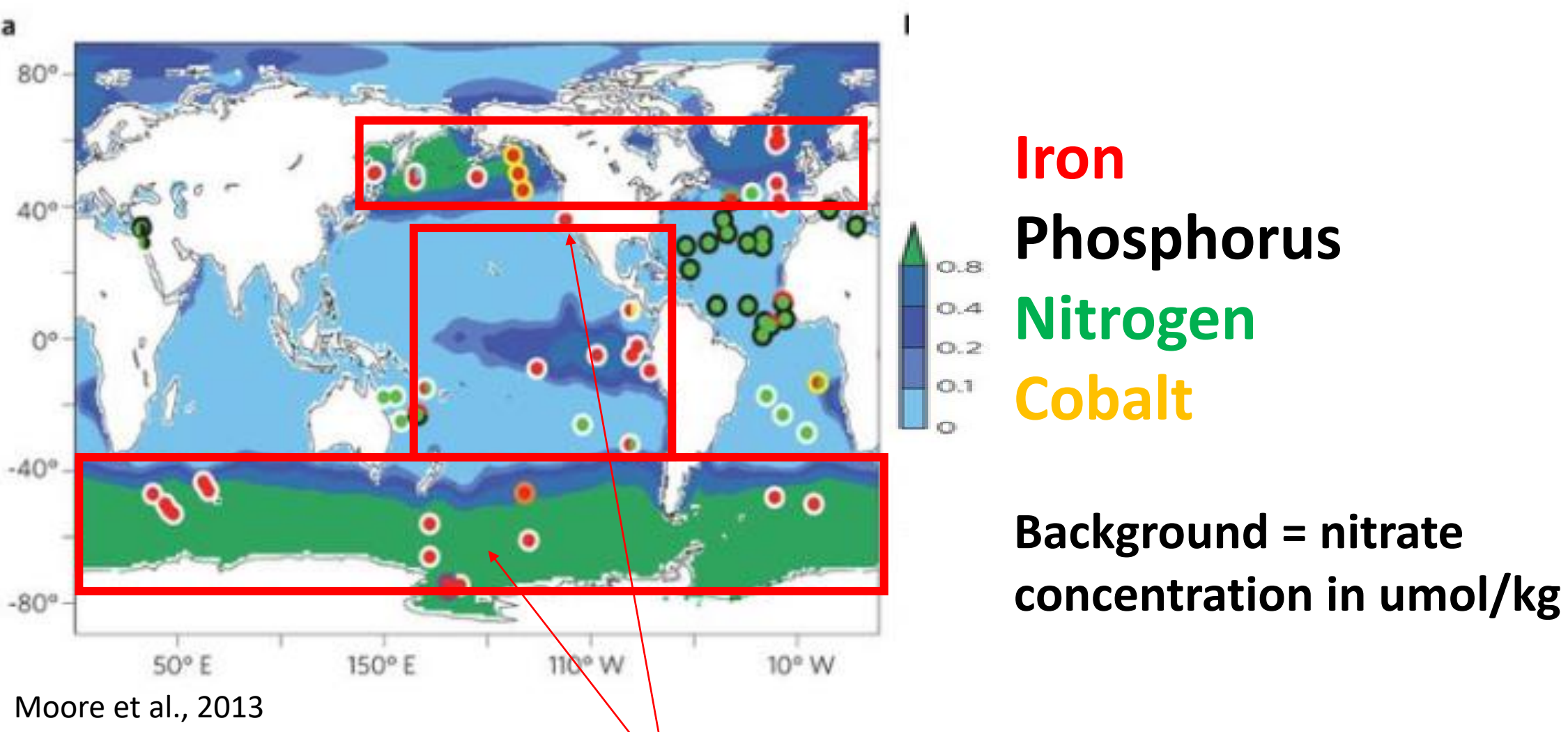
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Anthropogenic sources contribute 20-50% of atmospheric bioavailable iron to iron-limited North Pacific region.

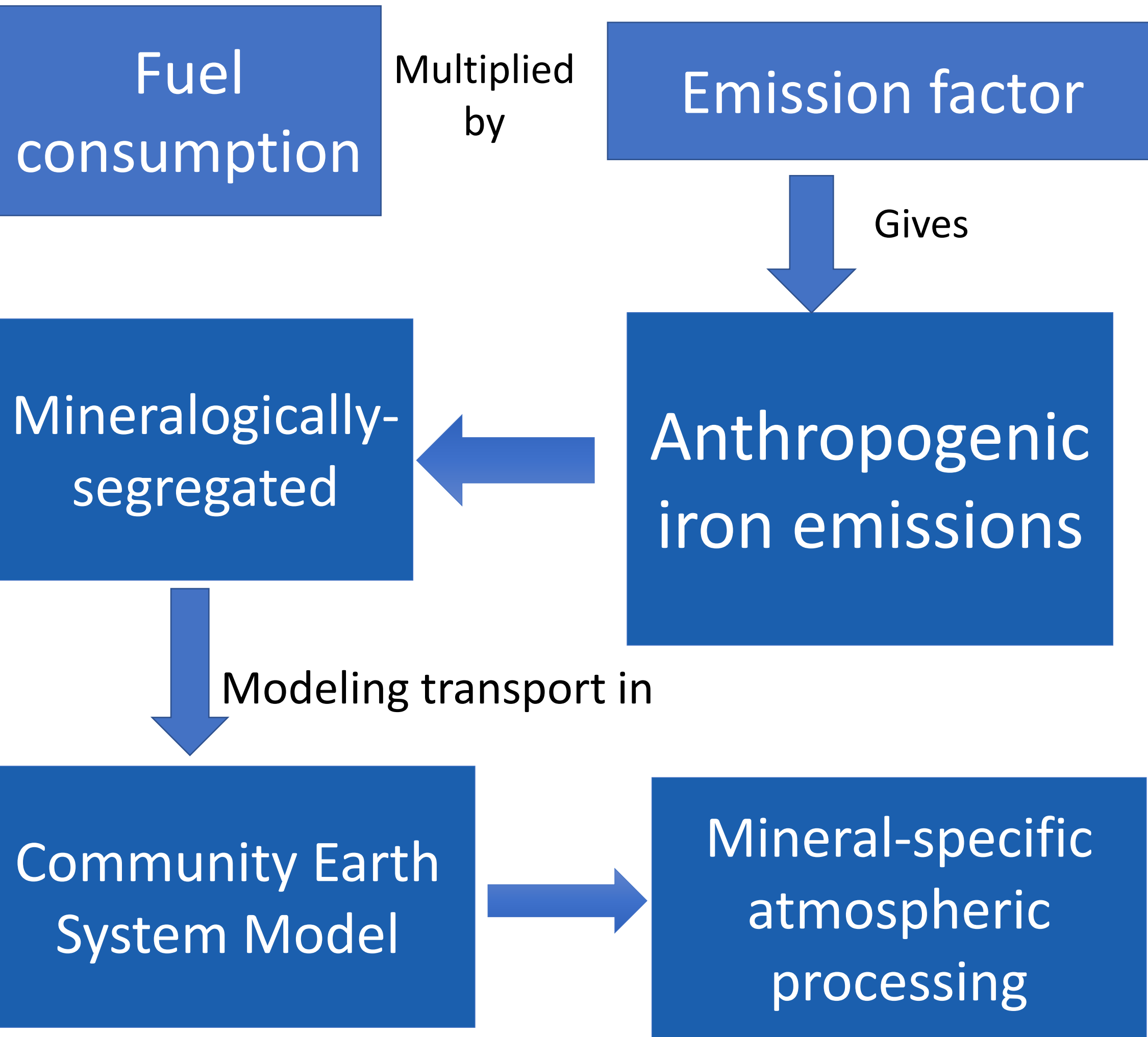
Background

Around 40% of the ocean region is iron limited for diatoms and phytoplankton growth and atmospheric iron deposition accounts for about 10-20% of ocean net primary productivity.

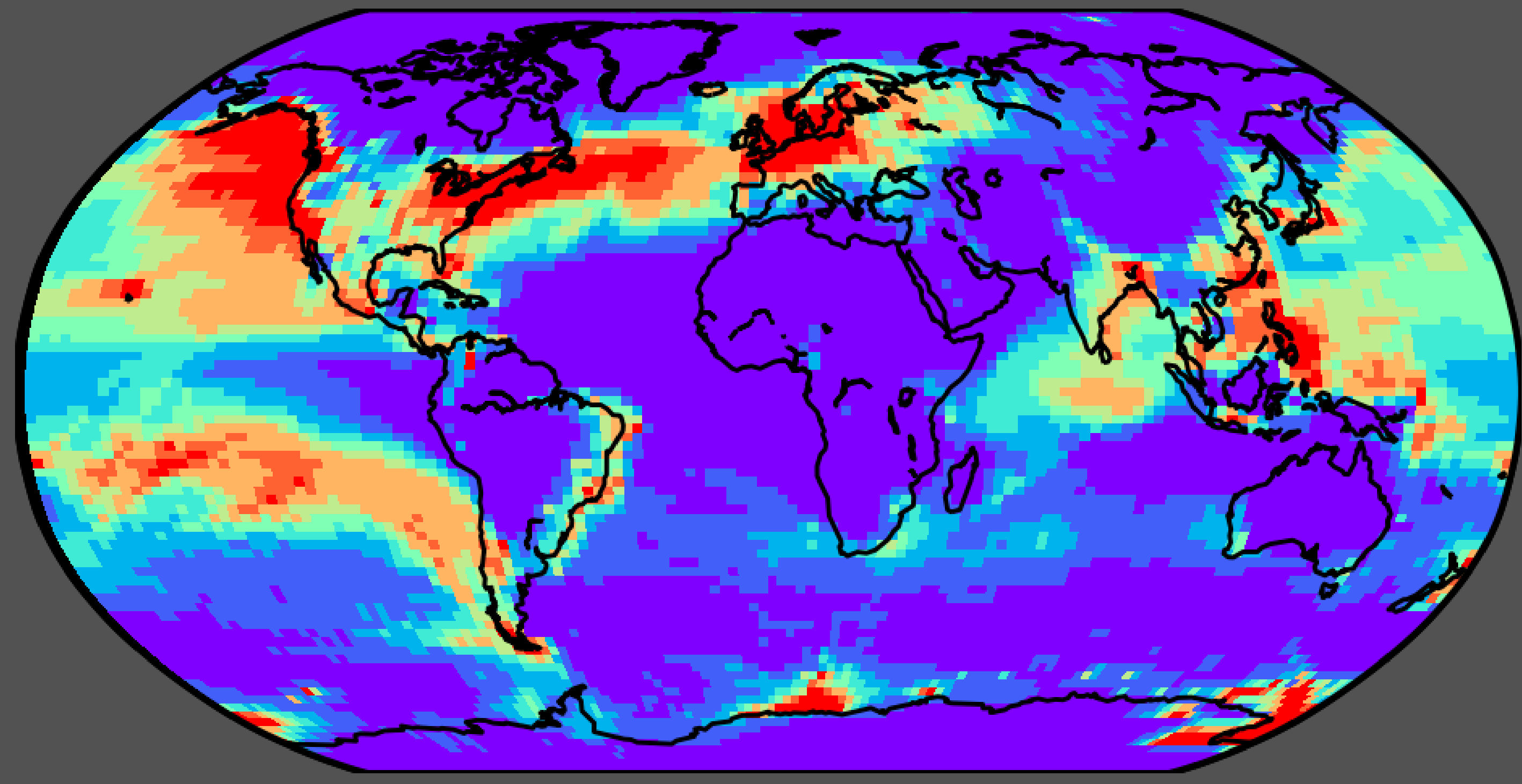


Moore et al., 2013

Methods

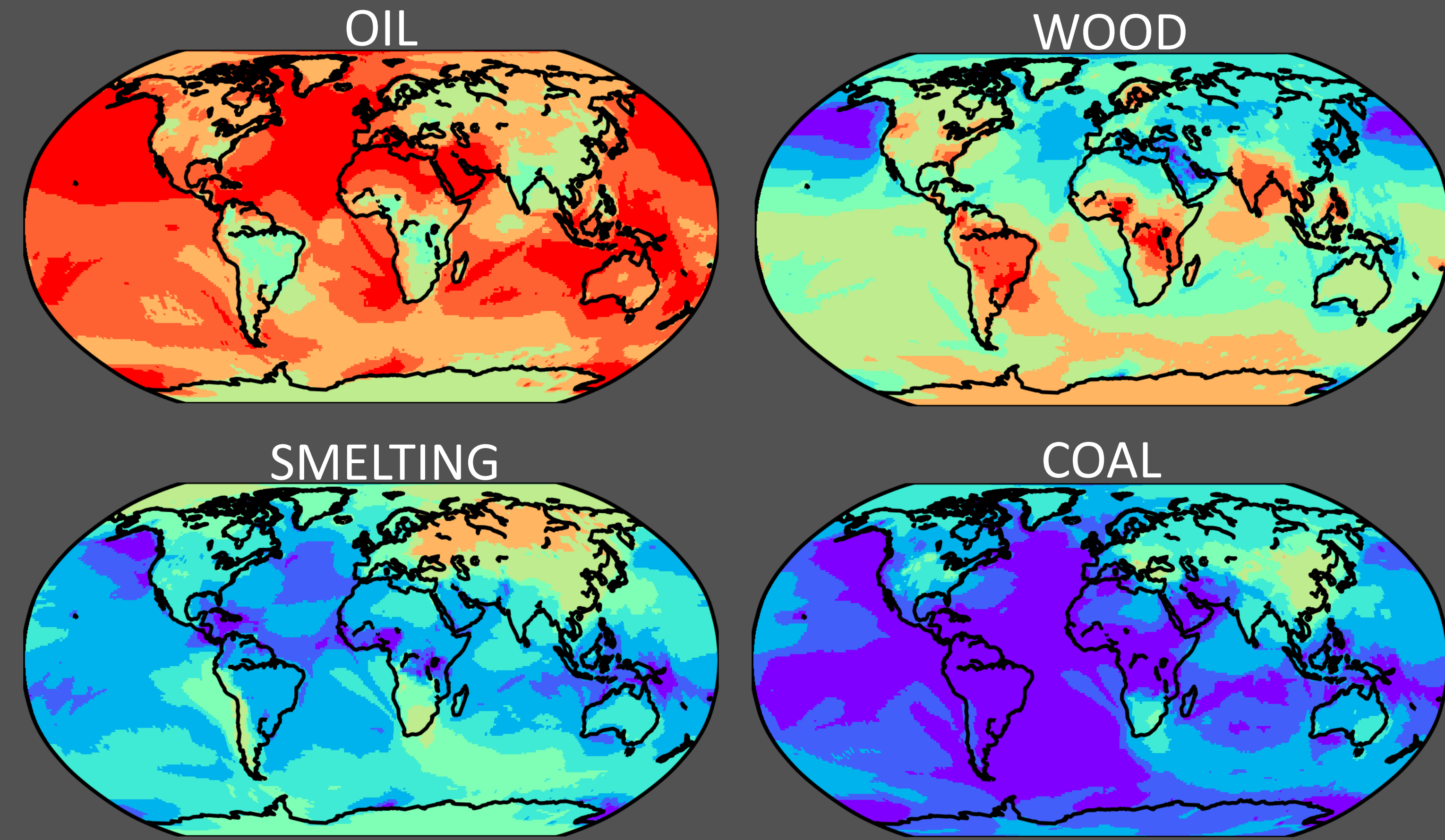


Prior studies used a general atmospheric processing scheme to model atmospheric conversion of insoluble to soluble iron



Percentage anthropogenic contribution to aerosol surface soluble iron concentration

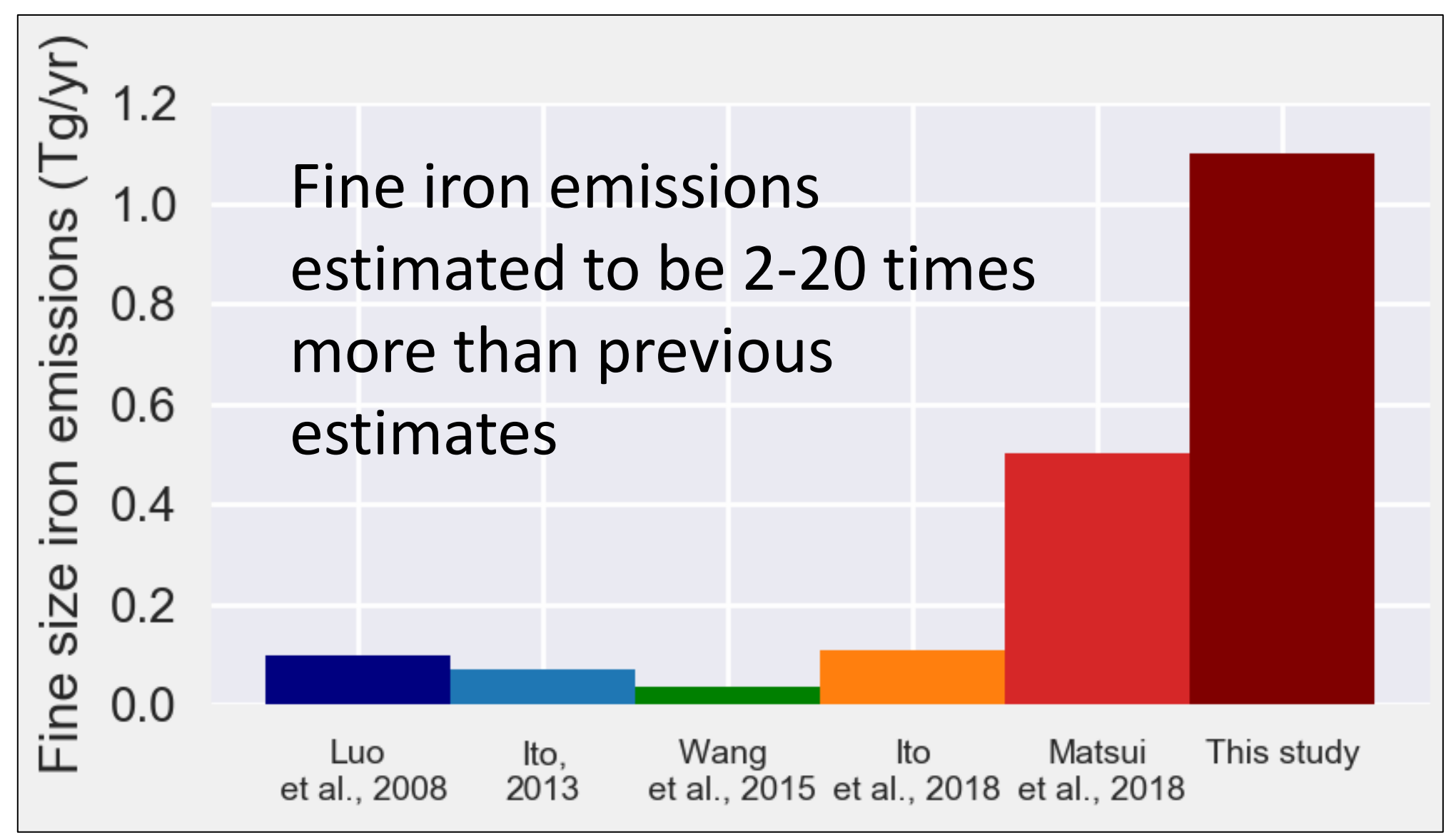
Oil combustion contributes to most of anthropogenic soluble iron supply due to high solubility. High solubility is caused by specific mineralogical composition.



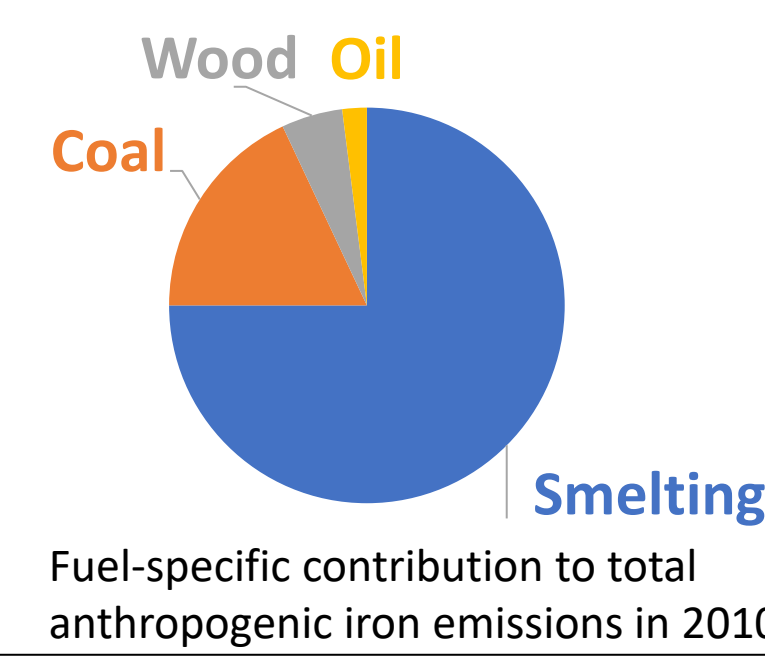
Sector-specific percentage contribution to anthropogenic aerosol surface soluble iron concentration

Results

Total iron emissions



Smelting contributes to about 70% of anthropogenic total iron emissions but less than 10% of soluble iron emissions; and was not accounted for in previous iron emissions inventories



Fe segregated by mineralogy

