ENHANCED ATMOSPHERIC SOLUBILIZATION OF IRON DUE TO ANTHROPOGENIC ACTIVITIES

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OBJECTIVE:

Assess soluble Fe deposition budgets, their global distribution, and the contribution of natural and anthropogenic sources under different climate scenarios.

MODEL DESCRIPTION:

EC-EARTH

1 *IRON EMISSIONS*

- Mineral Dust (95%) ← dust mineralogical composition
- Combustion (5%) ← anthropogenic & biomass bruning

2 *ATMOSPHERIC PROCESSING OF IRON*

- Proton-promoted dissolution
- Oxalate-promoted Fe dissolution
- Photo-reductive dissolution.

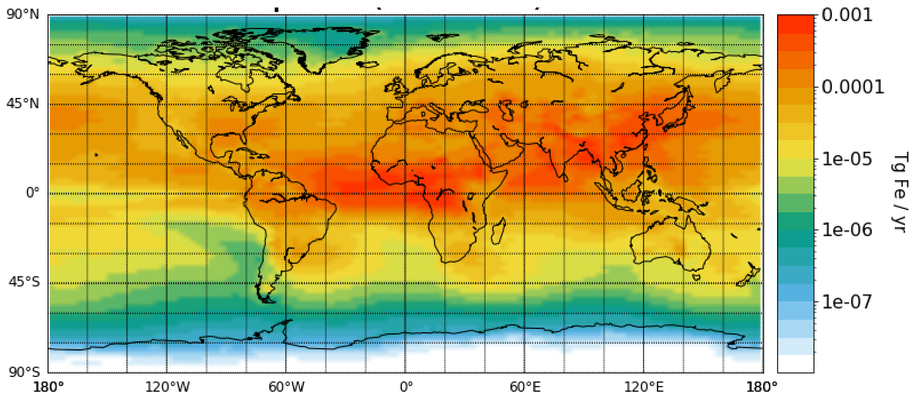
3 *DEPOSITION OVER OPEN OCEAN*

EXPERIMENTAL SETUP:

- **30 year-long time-slice experiments**
- **CMIP6 SCENARIOS**

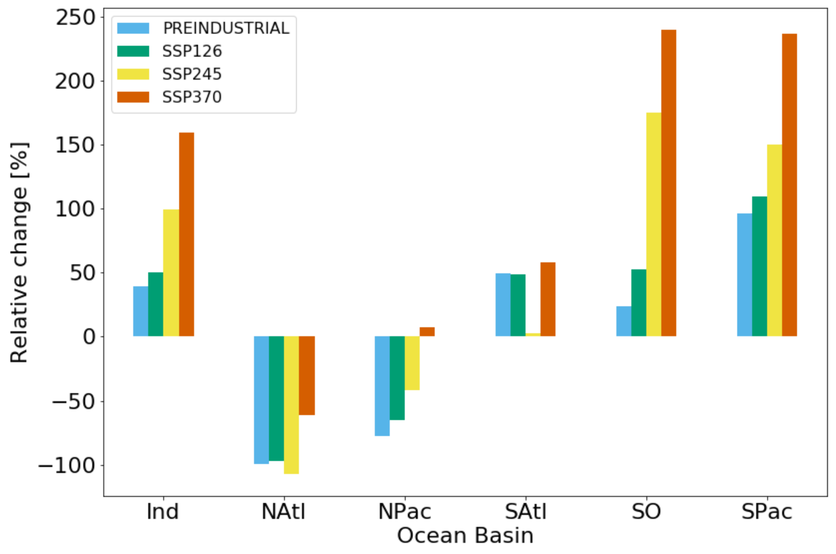
Preindustrial (1850)	Present (1985-2014)		Future Scenarios (2070-2099)		
Pre-industrial	AMIP	Historical	SSP1-2.6	SSP2-4.5	SSP3-7.0

Total Soluble-Fe Dep. HISTORICAL scenario (Annual mean)



Relative source contribution for each scenario and ocean basin

Relative Change [Scenarios-HISTORICAL] Soluble Fe Dep. by ocean basin



CONCLUSIONS

- ***Anthropogenic Emissions*** ↑ ***Atmospheric acidity and Oxalate concentrations*** ↑ ***Soluble-Fe Deposition***
- **Diverging trends for different ocean basins**

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Air-sea Chemical Fluxes : Impacts on Biogeochemistry and Climate