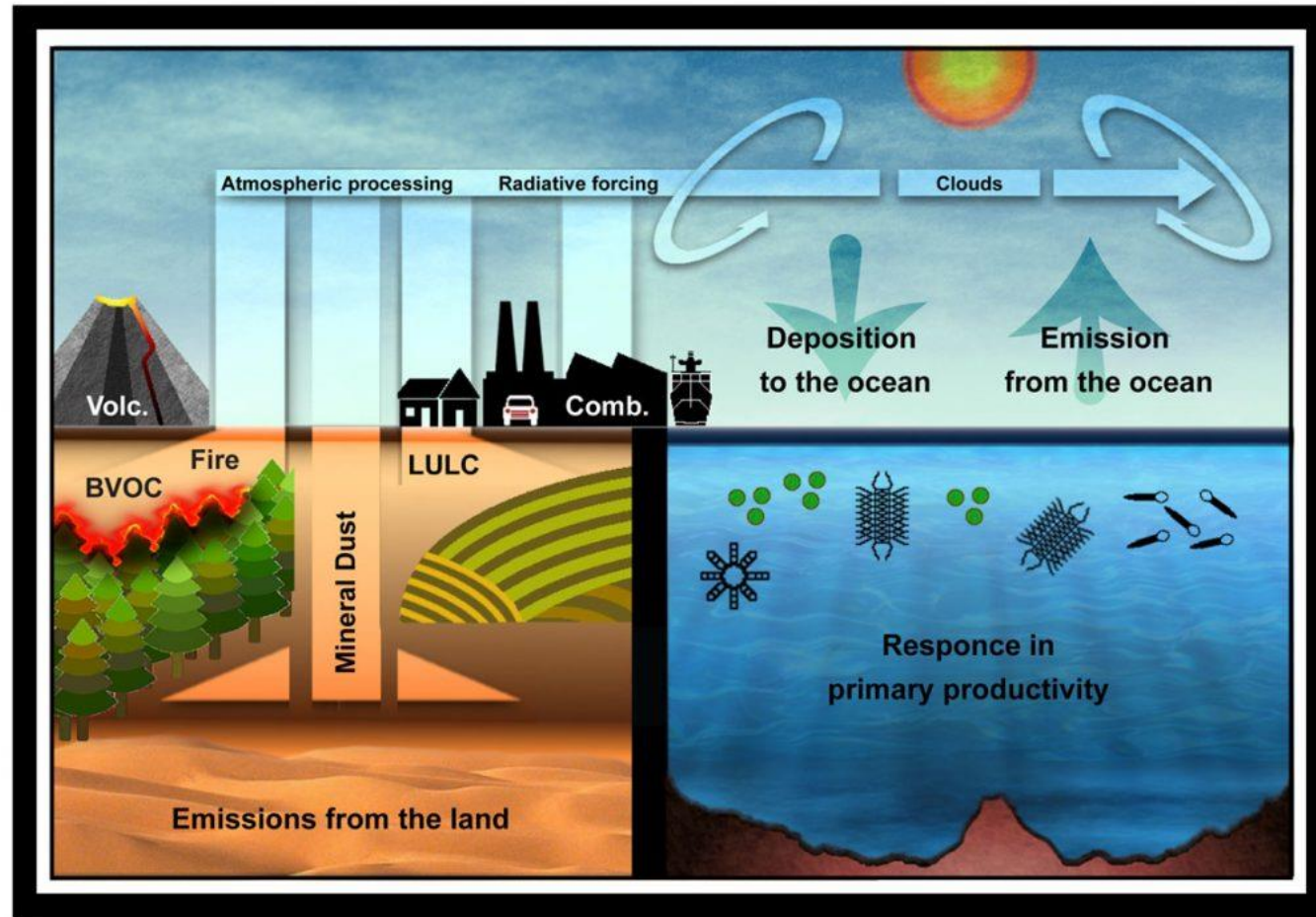


# Working Group 167 - RUSTED

## Reducing Uncertainty in Soluble aerosol Trace Element Deposition

Douglas S. Hamilton, Akinori Ito, Morgane M.G. Perron, (Rachel Shelley)



### Full Members

Name	Gender	ECR	Affiliation
Douglas Hamilton	N/Binary	Yes	North Carolina State University
Morgane Perron	F	Yes	LEMAR
Akinoro Ito	M	No	JAMSTEC
Alex Baker	M	No	University of East Anglia
Tung-Yuan Ho	M	No	Academia Sinica
Diego Gaiero	M	No	National University of Cordoba
Cassie Gaston	F	Yes	RSMAS/University of Miami
Ashwini Kumar	M	No	CSIR-National Institute of Oceanography
Ying Ye	F	Yes	Alfred Wegener Institute
Mingjin Tang	M	No	GIGCAS
Rachel Shelley	F	No	University of East Anglia
Hind Al-Abadleh	F	No	Wilfred Laurier University

### Associate Members

Name	Gender	ECR	Affiliation
Holly Winton	F	Yes	Victoria University of Wellington
Andrew Wozniak	M	No	University of Delaware
Joo-Eun Yoon	F	Yes	University of Cambridge
Yeala Shaked	F	No	Hebrew University of Jerusalem
Nicholas Meskhidze	M	No	North Carolina State University
Peter Croot	M	No	Irish National University, Galway
Cecile Guieu	F	No	LOV
Susanne Fietz	F	No	Stellenbosch University
Andy Bowie	M	No	University of Tasmania
Garima Shukla	F	Yes	CSIR-National Institute of Oceanography

**14 countries - 25% ECR - 45% women**

Referee : Kai Deng (previously Marie-Alexandrine Sicre)

# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

Presentation

Progress

Way forward

TERMS OF REFERENCE - ToRs

ToR 1

**Literature** : Review literature on aerosol leaching protocols + Glossary

ToR 2

**Assessment** : Aerosol trace element solubility protocol intercomparison study - SOP

ToR 3

**Tools and chemical tracers** to better understand aerosol Fe solubility + A comprehensive open access data repository

ToR 4

**Observations vs Models** : links and differences

## Key deliverables



# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

Presentation

Progress

Way forward

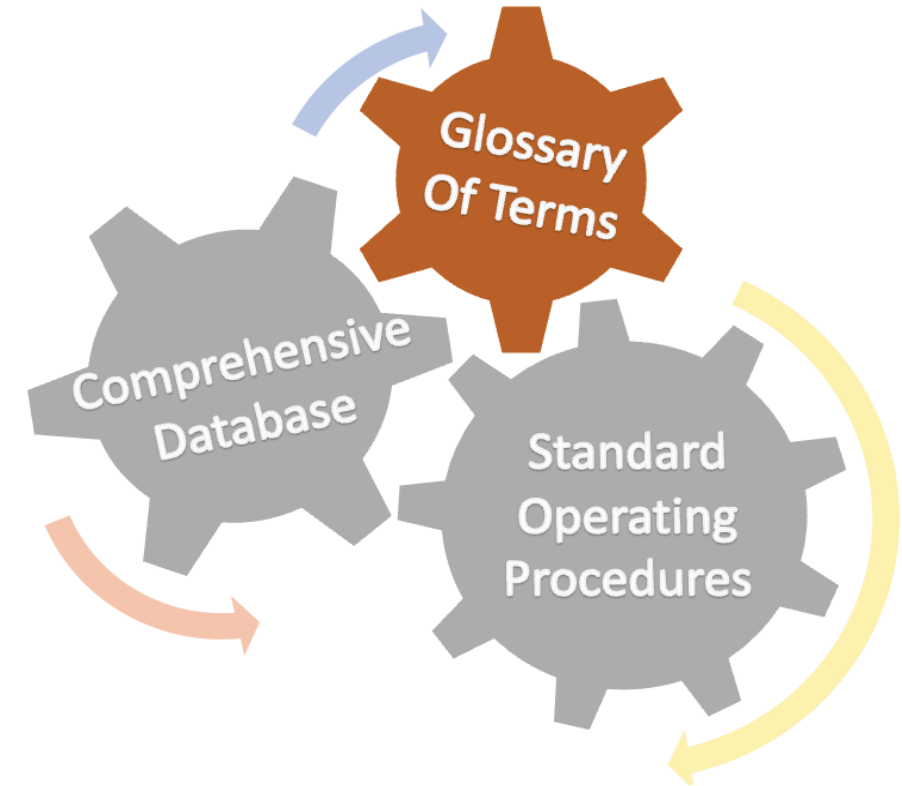
ToR 1

**Literature** : Review literature on aerosol leaching protocols + Glossary

📷 Manuscript being drafted : “Review on leaching protocols”

📷 Glossary to be included in SI

**Key deliverables**



# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

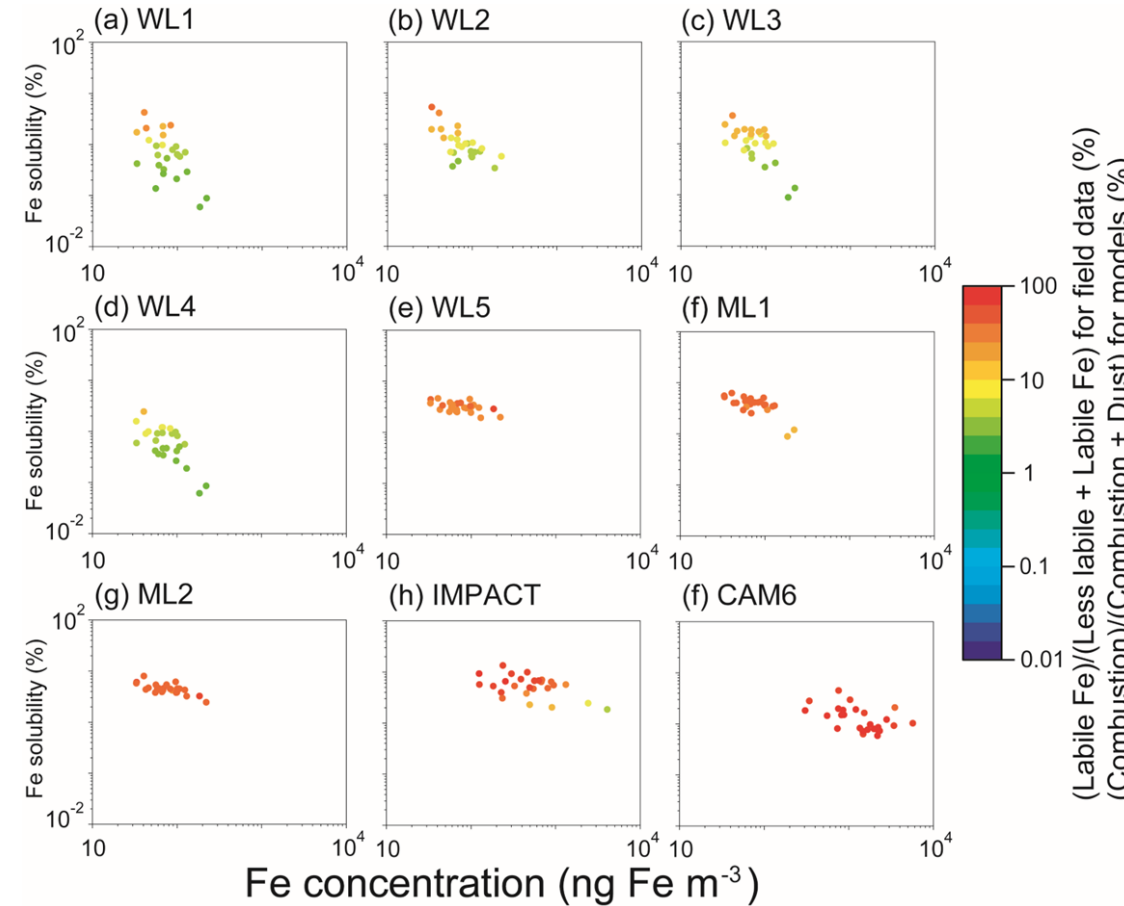
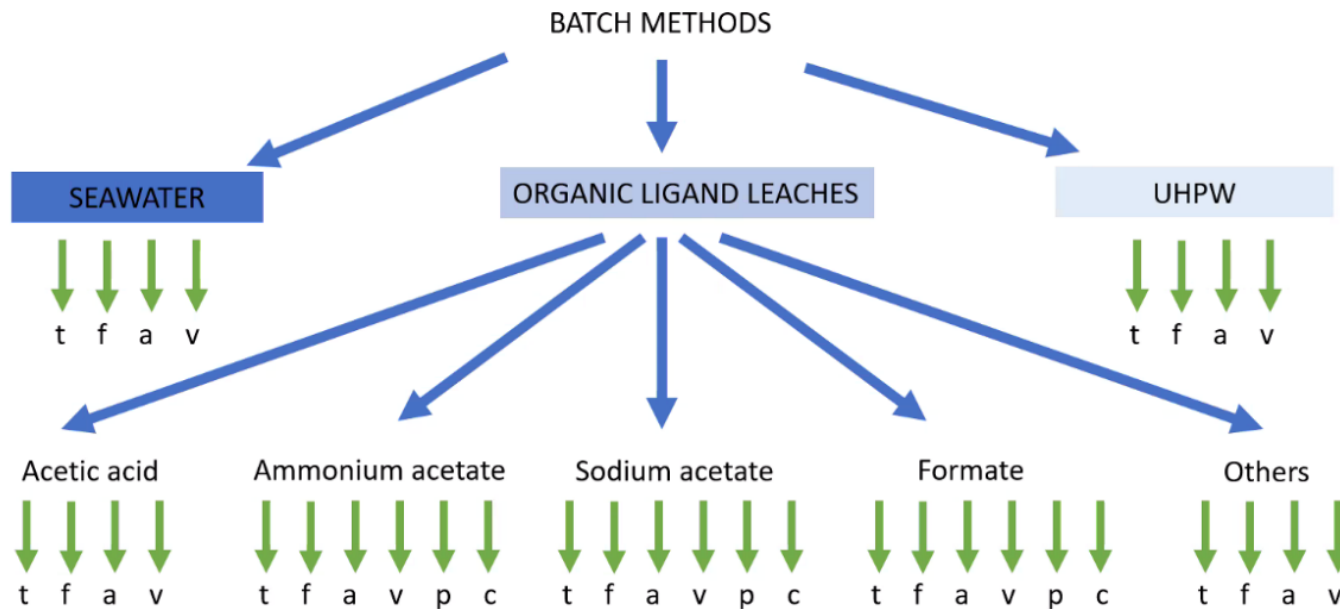
Presentation

Progress

Way forward

ToR 1

Literature : Review literature on aerosol leaching protocols + Glossary



# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

Presentation

Progress

Way forward

ToR 2

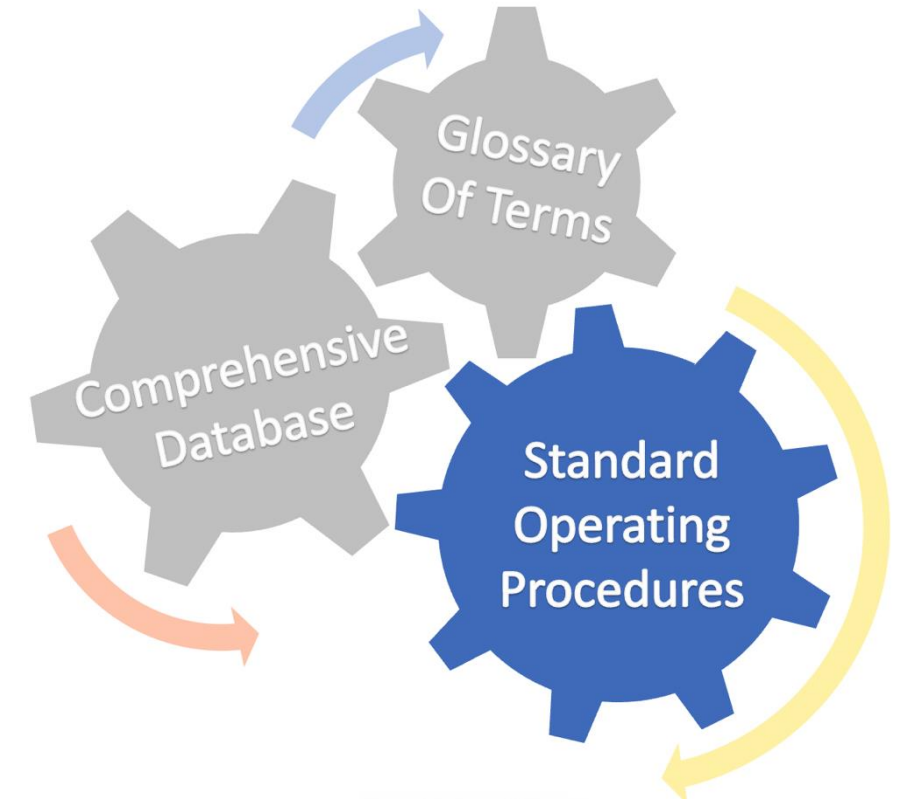
**Assessment** : Aerosol trace element solubility protocol intercomparison study - SOP

✓ Published manuscript : laboratory inter-comparison work

✓ SOP: recommendations included in the manuscript

📷 Discussions with GEOTRACES for inclusion of SOP in Cookbook (OSM 2026)

**Key deliverables**



# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

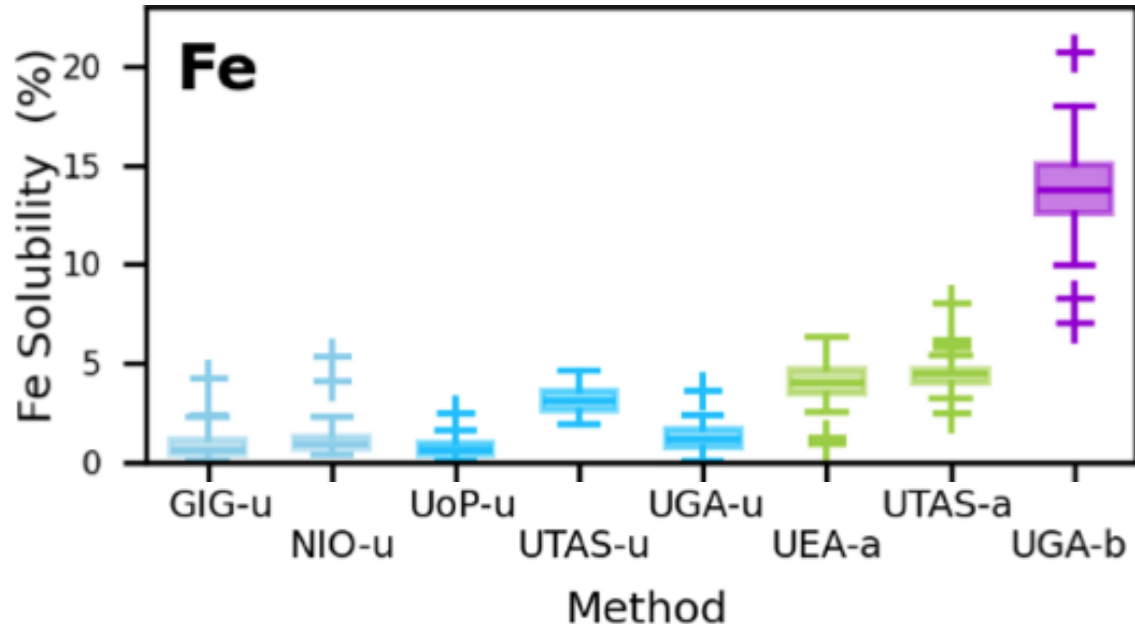
Presentation

Progress

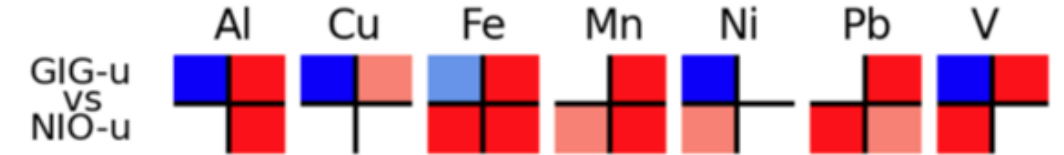
Way forward

ToR 2

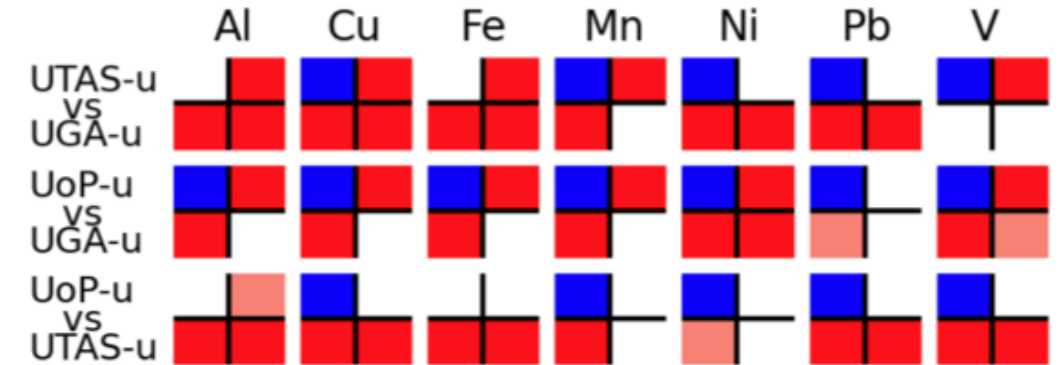
Assessment : Aerosol trace element solubility protocol intercomparison study - SOP



## Batch UPW Methods



## Flow UPW Methods



## Ammonium Acetate Methods



Blue or Red p < 0.05  
Dark Blue or Dark Red p < 0.01

1	2
4	3

 (numbers defined in caption)

# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

Presentation

Progress

Way forward



Discussions with atmosphere-ocean community at the Iron at the Air-Sea interface , Asheville, USA

Iron at the Air-Sea Interface Workshop  
alongside RUSTED Annual Meeting 2025  
28-31 July 2025 in Asheville, NC



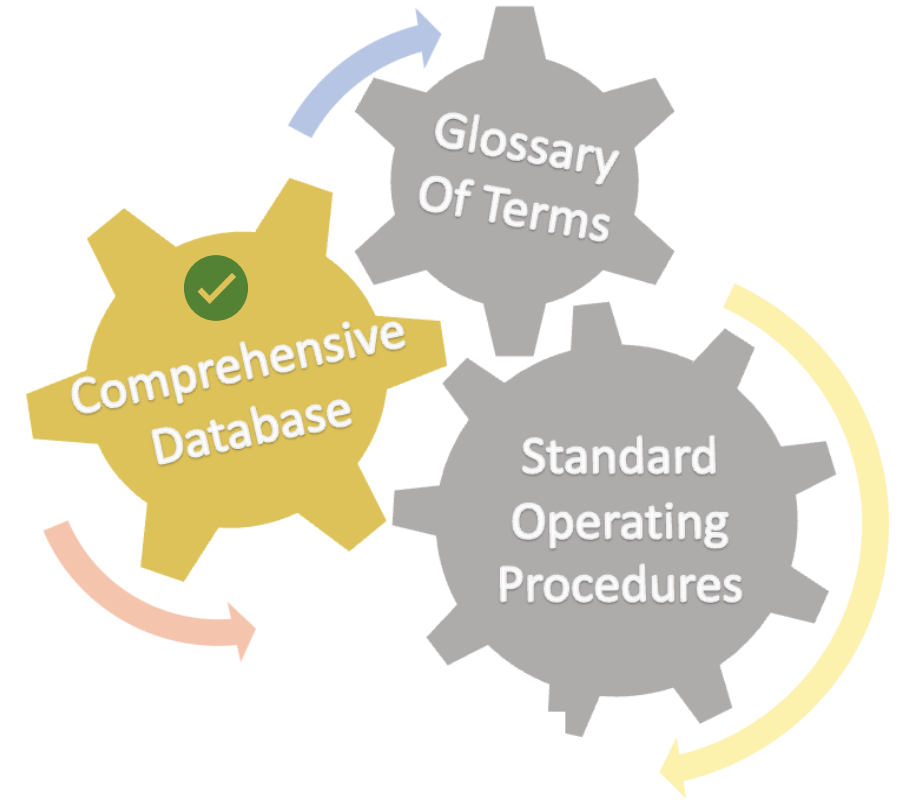
ToR 3

Tools and chemical tracers to better understand aerosol Fe solubility + A comprehensive open access data repository



Recommendations to be included in the synthesis paper

## Key deliverables



# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

Presentation

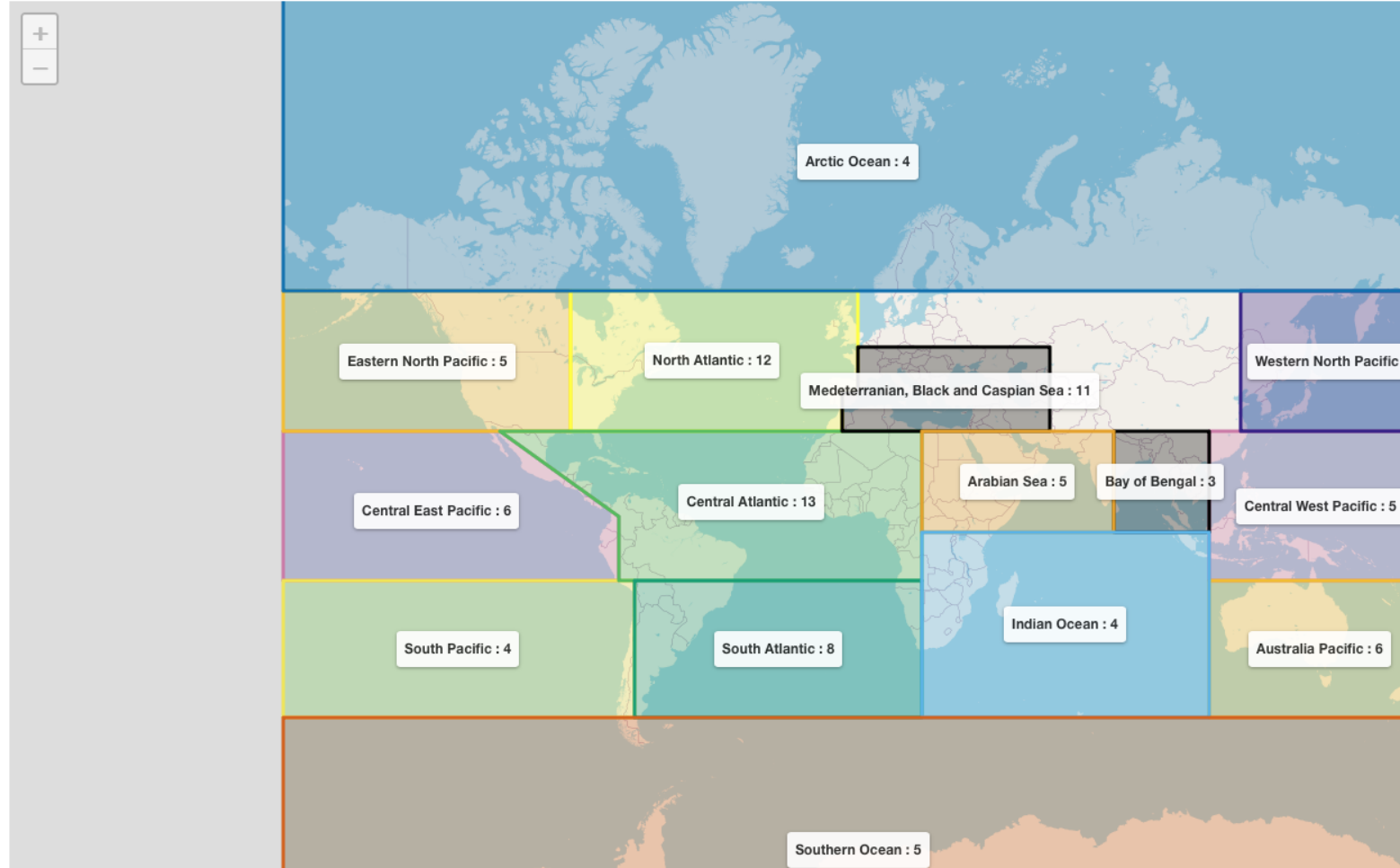
Progress

Way forward

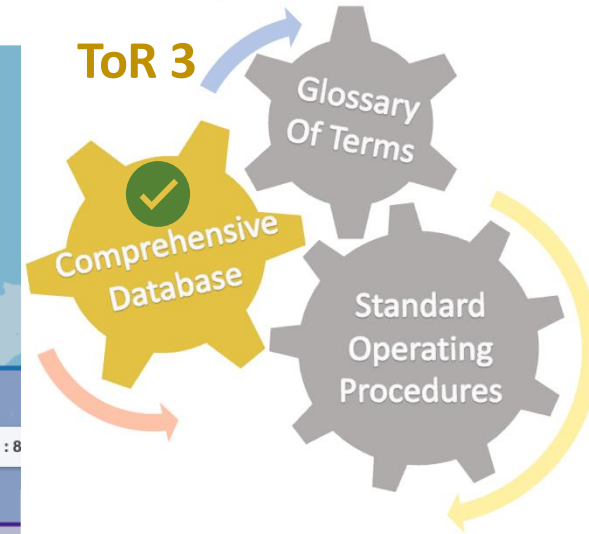
OCEAN MAP RESEARCH TABLE IMPORTANT LINKS

RESET SELECTION X

- Select All
- Iron (Fe)
- Total
- Soluble
- Acid
- Seawater
- Pure Water
- Major Ions (MI)
- Aluminum (Al)
- Manganese (Mn)
- Lead (Pb)
- Zinc (Zn)
- Nitrogen (N)
- Vanadium (V)
- Calcium (Ca)
- Phosphorus (P)
- Titanium (Ti)
- Potassium (K)



Key deliverables



+ associated paper to be drafted

<https://ocean-trace-research.github.io/research-visualization/>

# Reducing Uncertainty in Soluble aerosol Trace Element Deposition

Presentation

Progress

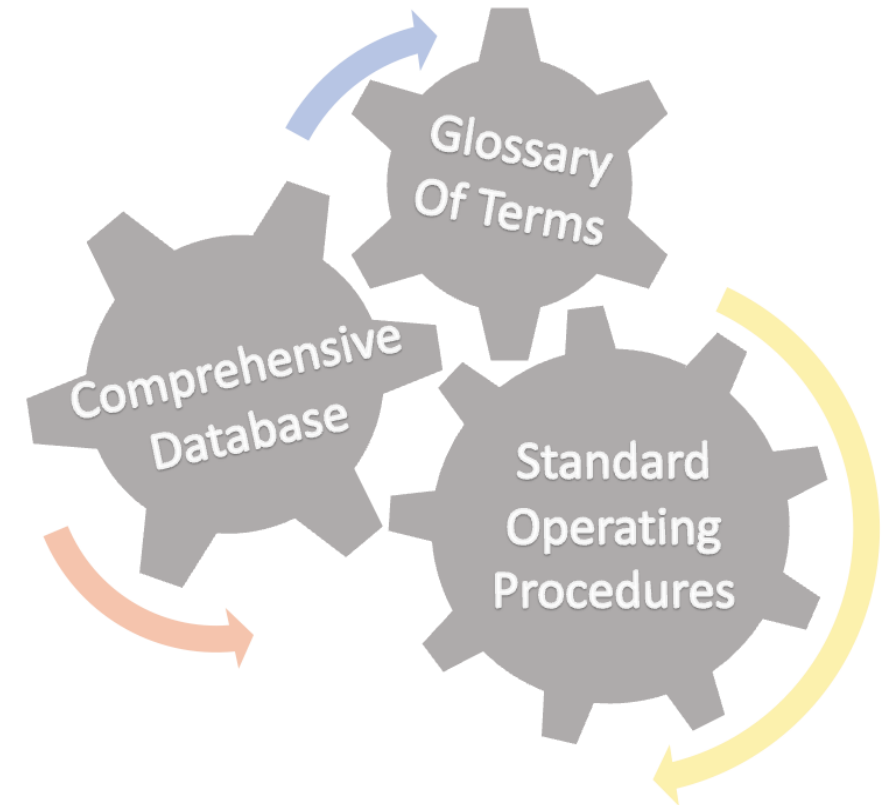
Way forward

- ✓ Member contributions to 3 manuscripts (1 included in the RUSTED SI)
- 📷 Discussion included in the Review Paper (ToR1)
- 📷 MIP initiated (RUSTED legacy)

ToR 4

Observations vs Models : links and differences

## Key deliverables



## Capacity Building

**Aim :** Build a common research framework to facilitate knowledge transfer between ocean biogeochemistry, atmospheric science and modelling communities world-wide.

- **Train :** 4-day ECR workshop-lectures series in India (early 2025)
- **Share :** Open-access and accessible database
- **Support :** ECR, development, diversity and equity



## Outreach

- **ECR Workshop, SOLAS OSC 2024, 17 attendees**
- **RUSTED-SOLAS-FeMIP meeting**
- **RUSTED discussion session**
  
- **Iron at the Air-Sea Interface workshop, July 2025(23 onsite + 31 virtual)**
  
- **RUSTED Special Issue (Copernicus Publications, EGU) : 14 papers listed**



## Program Synergy



- **GEOTRACES**
  - 2024 : Meeting in Goa (India)
  - 2026 : Meeting in Glasgow (UK)
- **SOLAS**
  - 2024 : Meeting in Goa (India)  
Co-organisation of ECR workshop in Goa
  - SOLAS Event reports
  - RUSTED members involved in SOLAS ECSC and SSC
- **GESAMP**
  - 2025 : Participation in the GESAMP workshop in Crete (Grece)

# RUSTED

Presentation

Progress

Way forward

February 2026

RUSTED Annual meeting  
(OSM 2026, Glasgow, UK)



December - January 2025

- Draft of Review paper
- Draft of Asheville workshop white paper
- International Indian Ocean Science Conference 2025

March 2026

CMIP Community workshop (Kyoto, Japan)

November 2026

Closing of the RUSTED Special Issue

# Thank you

RUSTED is thankful for SCOR support for the 3<sup>rd</sup> year of the working group.

We thank Marie Alexandrine Sicre and Kai Deng for their role as referees, and Emily Twigg for continued guidance and support during these 3 years.