

Molecular Insights into the Atmospheric Composition of Ambient Aerosols over South Asia - Sources and Impacts

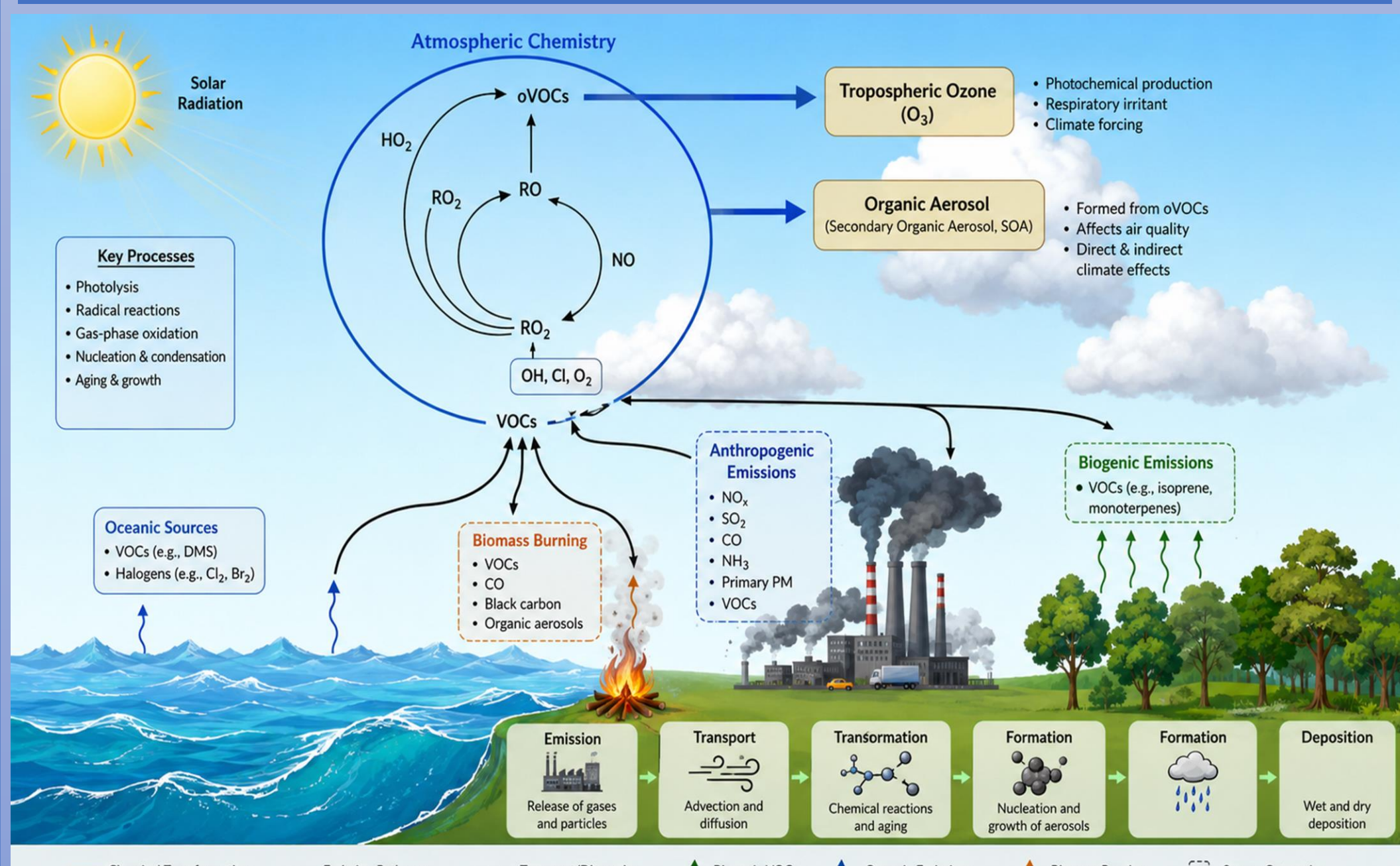
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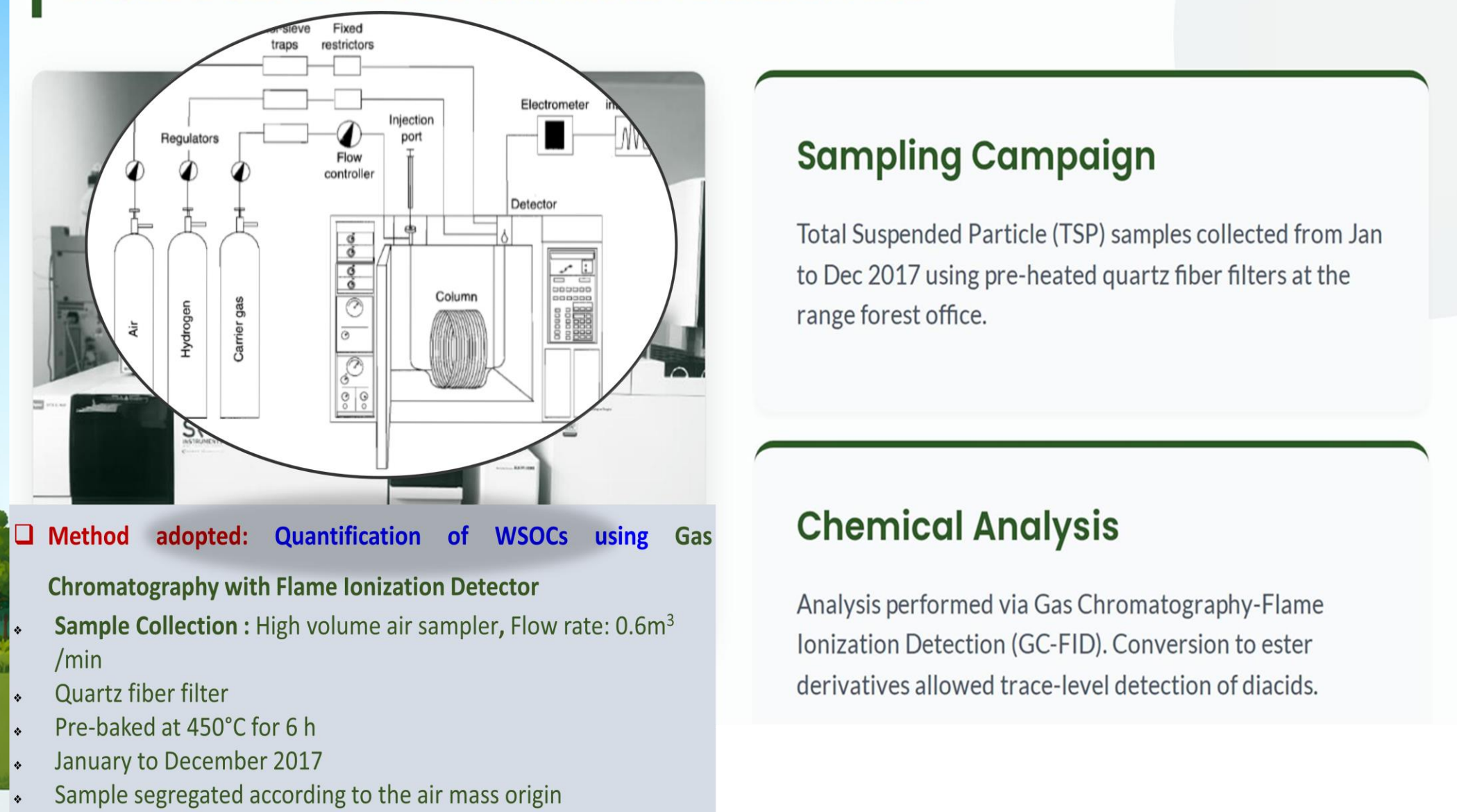


Background

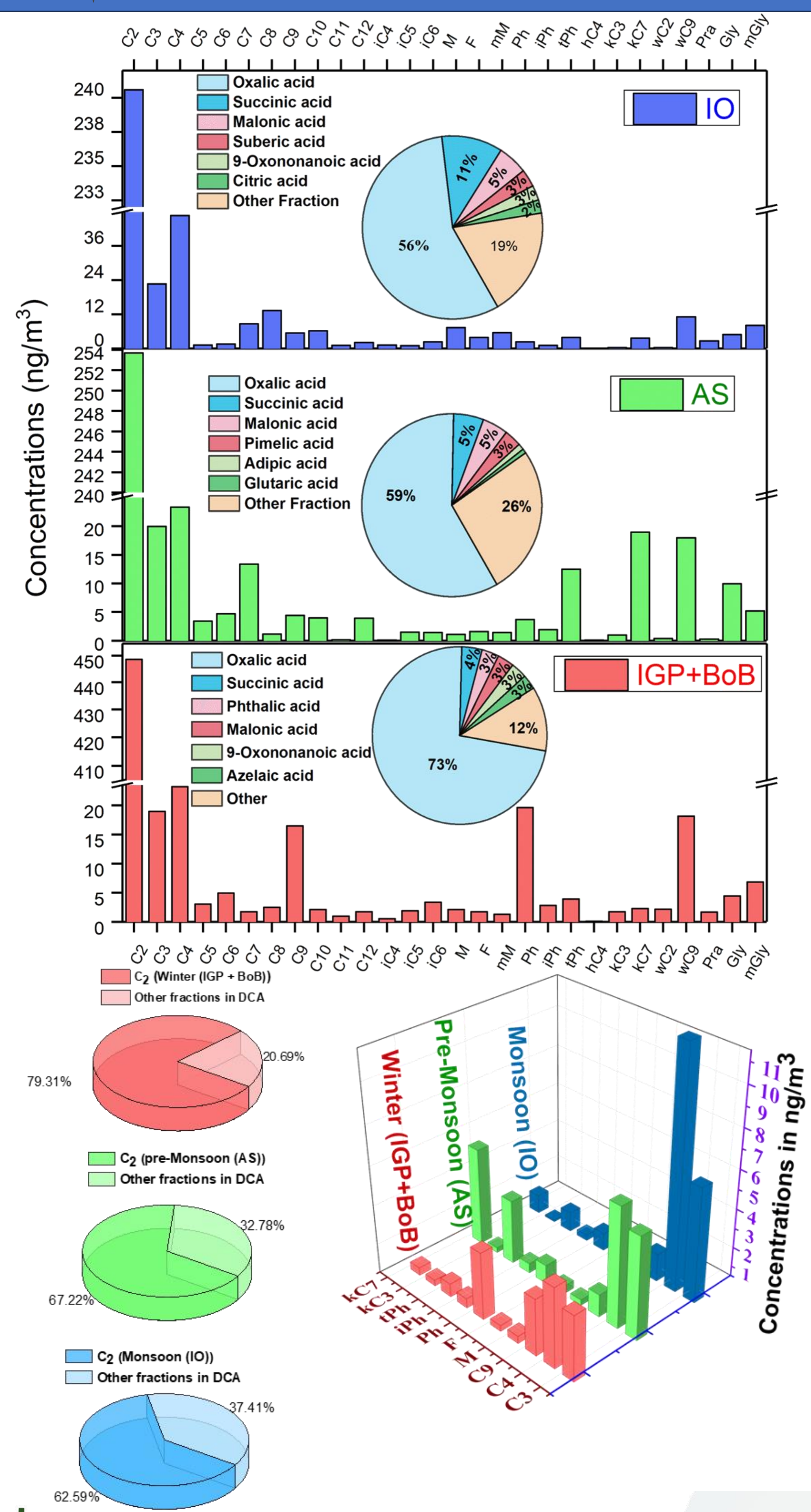


Methodology

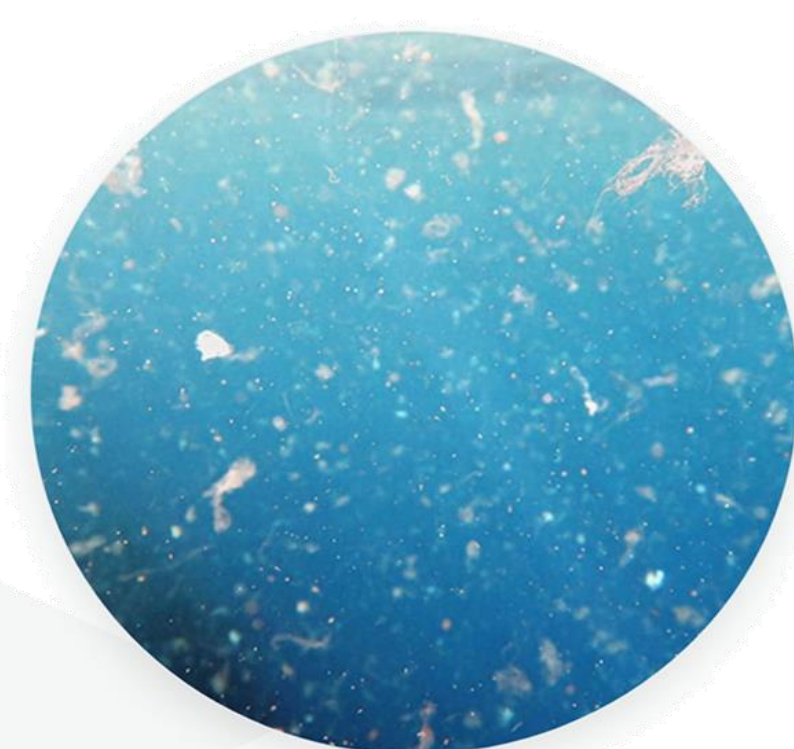
MOLECULAR LEVEL CHARACTERIZATION



Results and Discussions



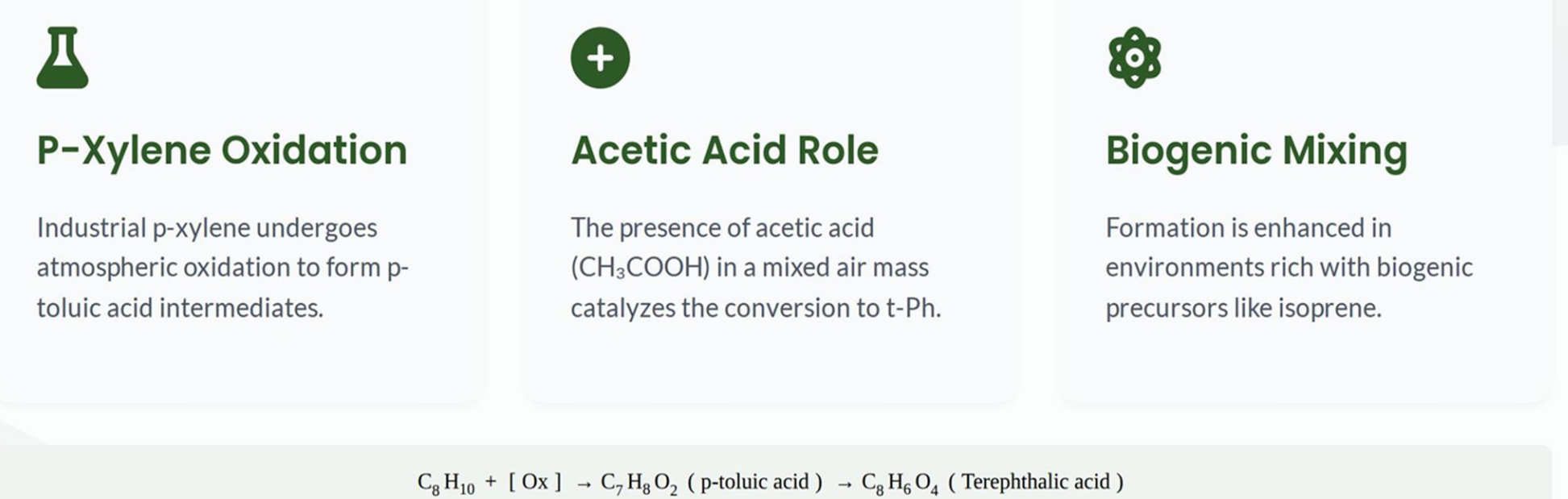
MARINE PLASTIC AS AN AEROSOL SOURCE



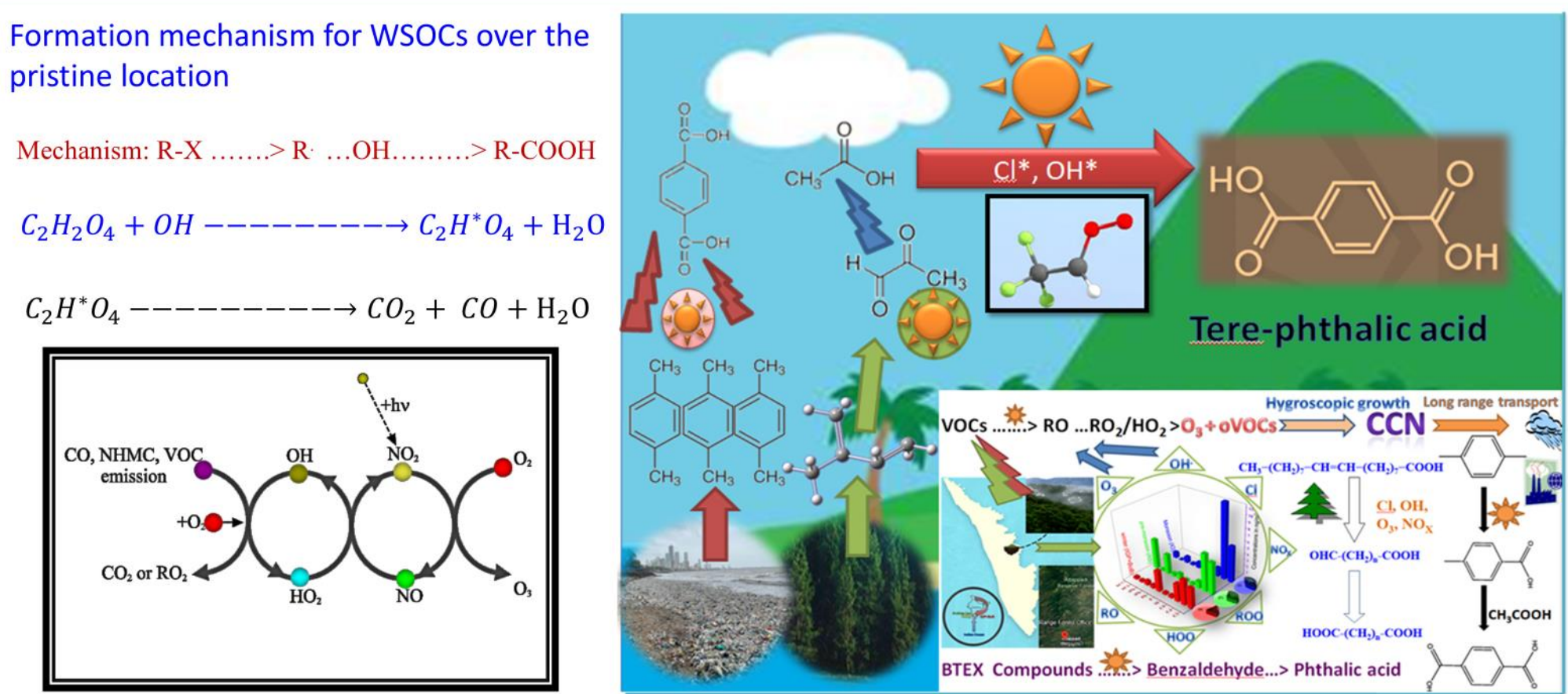
PET Degradation

Poly(ethylene terephthalate) floating in the ocean degrades under UV light and ozone, releasing phthalate monomers into the boundary layer. These precursors are then transported over the Western Ghats, significantly altering the aerosol chemistry of 'pristine' rainforests.

PROPOSED TEREPHTHALIC ACID MECHANISM

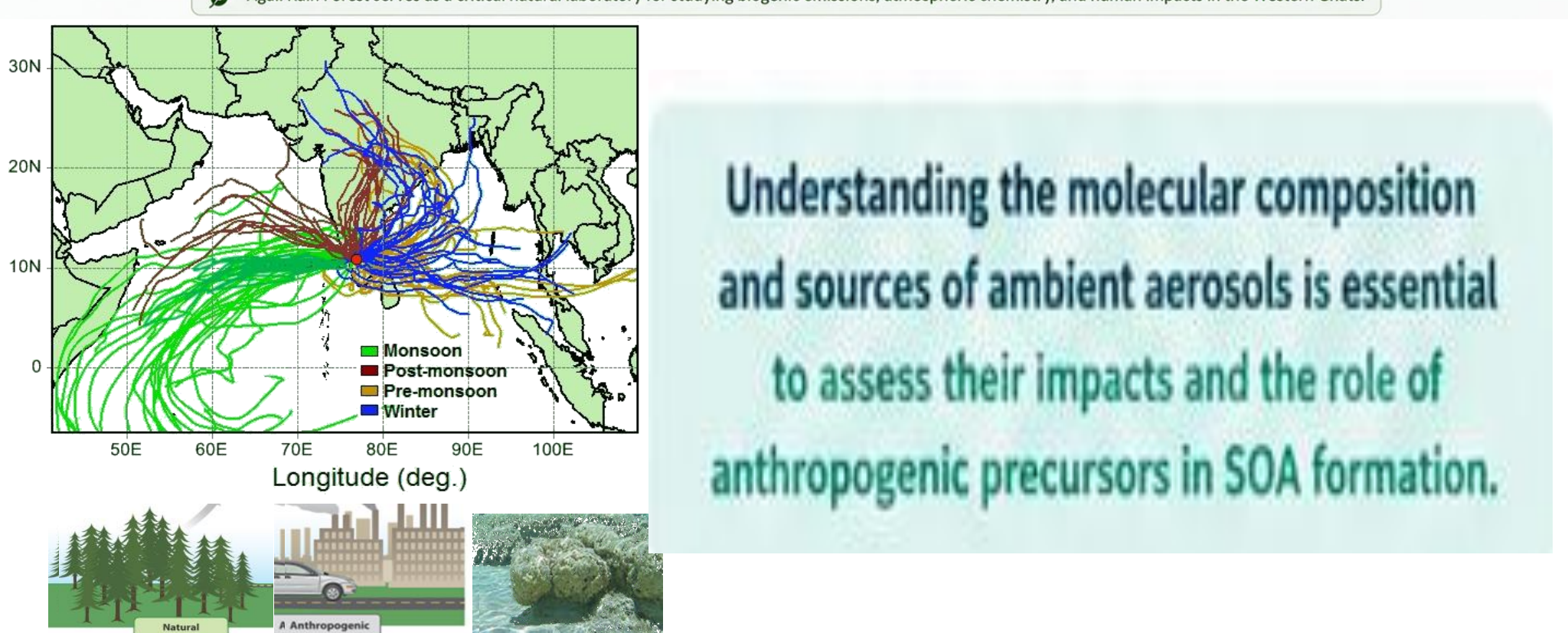
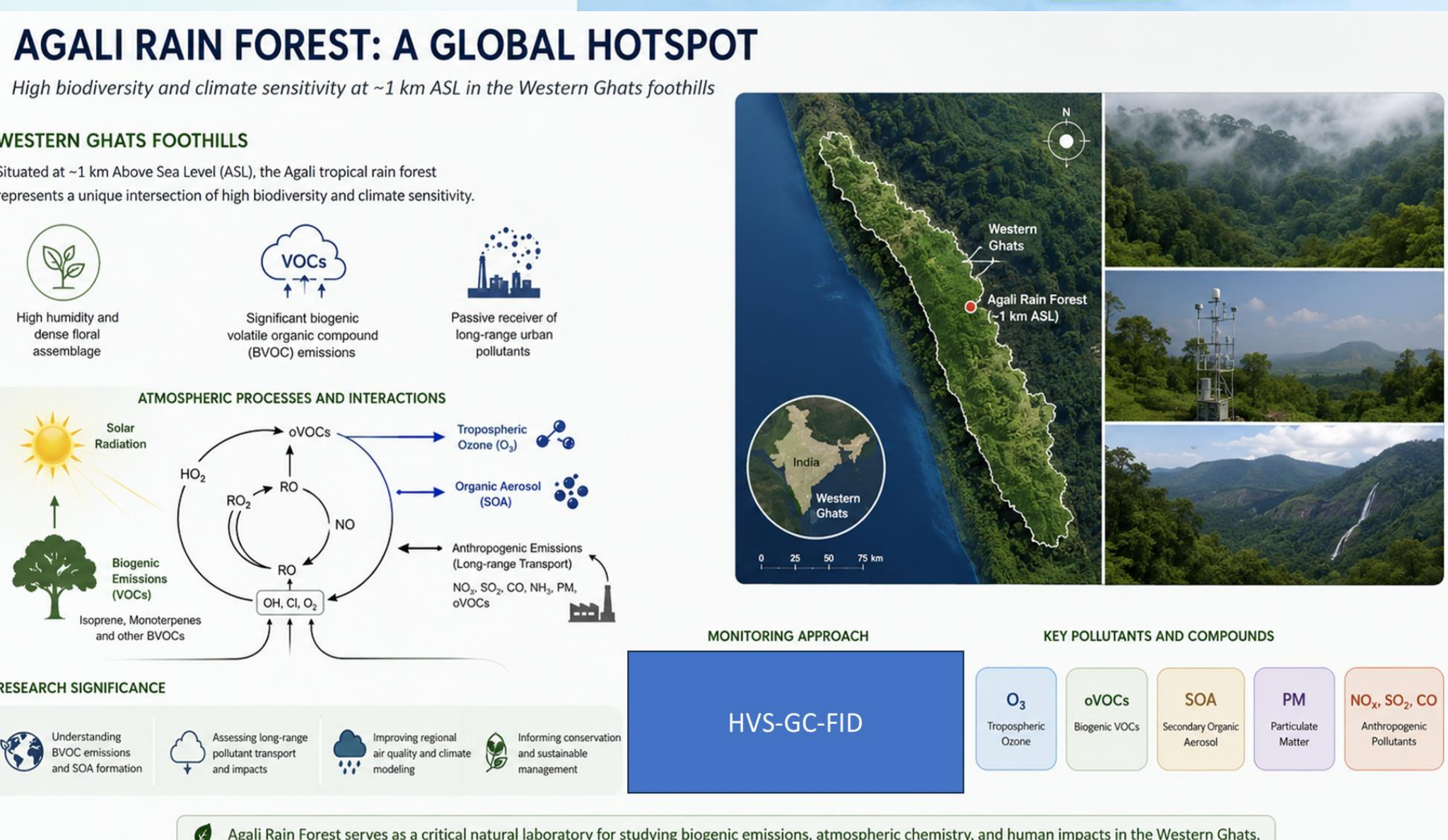
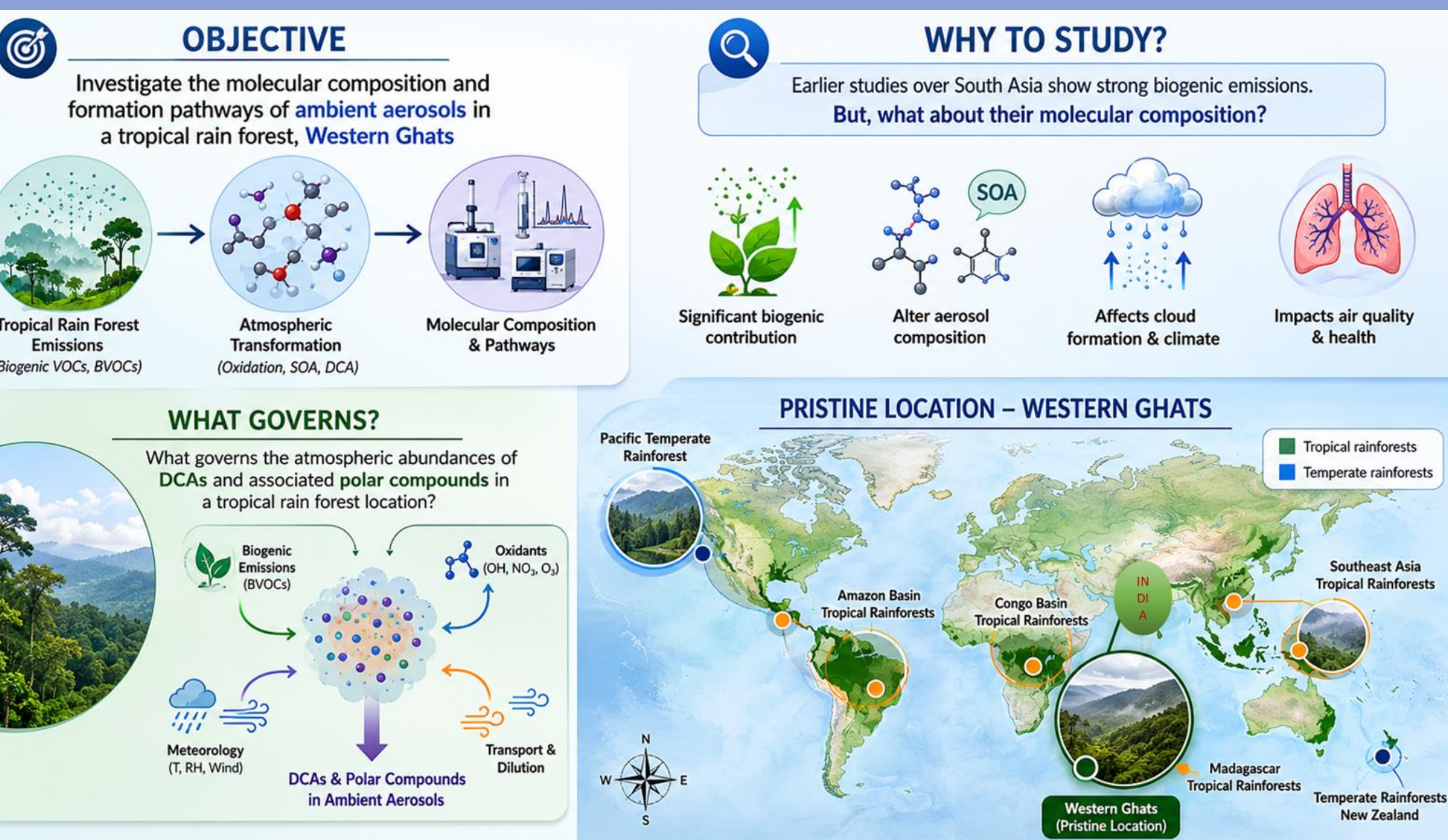


Molecular Insights into the Impact of Anthropogenic Precursors on SOA Formation in Remote Pristine Environments



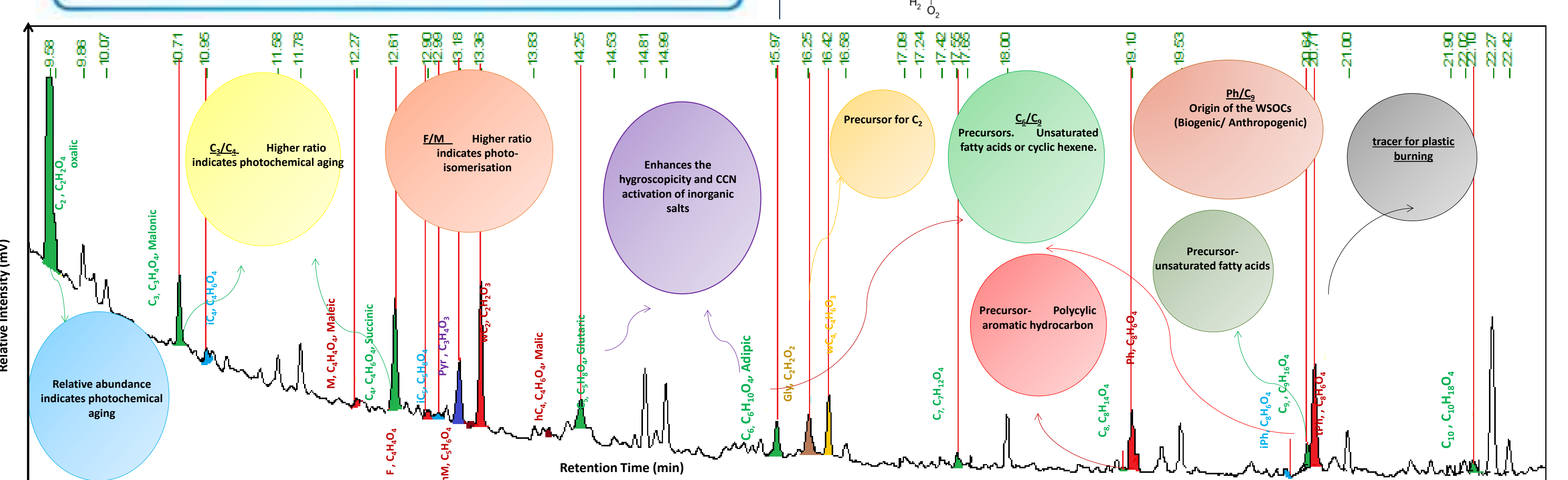
Conclusion

- Proposed Formation Mechanism for Ph and t-Ph
- Plastic Waste (Littered) act as source for Aerosol Precursor
- Anthropogenic Signatures in Remote Environments
- Impact of mixed precursor sources
- Health and climate Impacts of long range transported aerosols
- Unreveled the formation mechanism for WSOs over the pristine location



2. Research Questions / Objectives

- What are the molecular characteristics and composition of ambient aerosols over South Asia?
- What are the major sources (anthropogenic vs. natural) and their relative contributions?
- How do anthropogenic precursors influence SOA formation in remote pristine environments?
- What are the implications for regional air quality, climate and long-range transport?



References

- Kawamura, K. and Bikkina, S., 2016. *Atmospheric Research*, 170, pp.140-160.;
Ramya, C.B., Aswini, A.R., Hegde, P., Boreddy, S.K. and Babu, S.S., 2023. *Science of The Total Environment*, 900, p.165644.
Ramya, C.B., Aryasree, S., Hegde, P., Deshmukh, D.K. and Babu, S.S., 2025.. *ACS Omega* (DOI 10.1021/acsomega.5c06128).
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