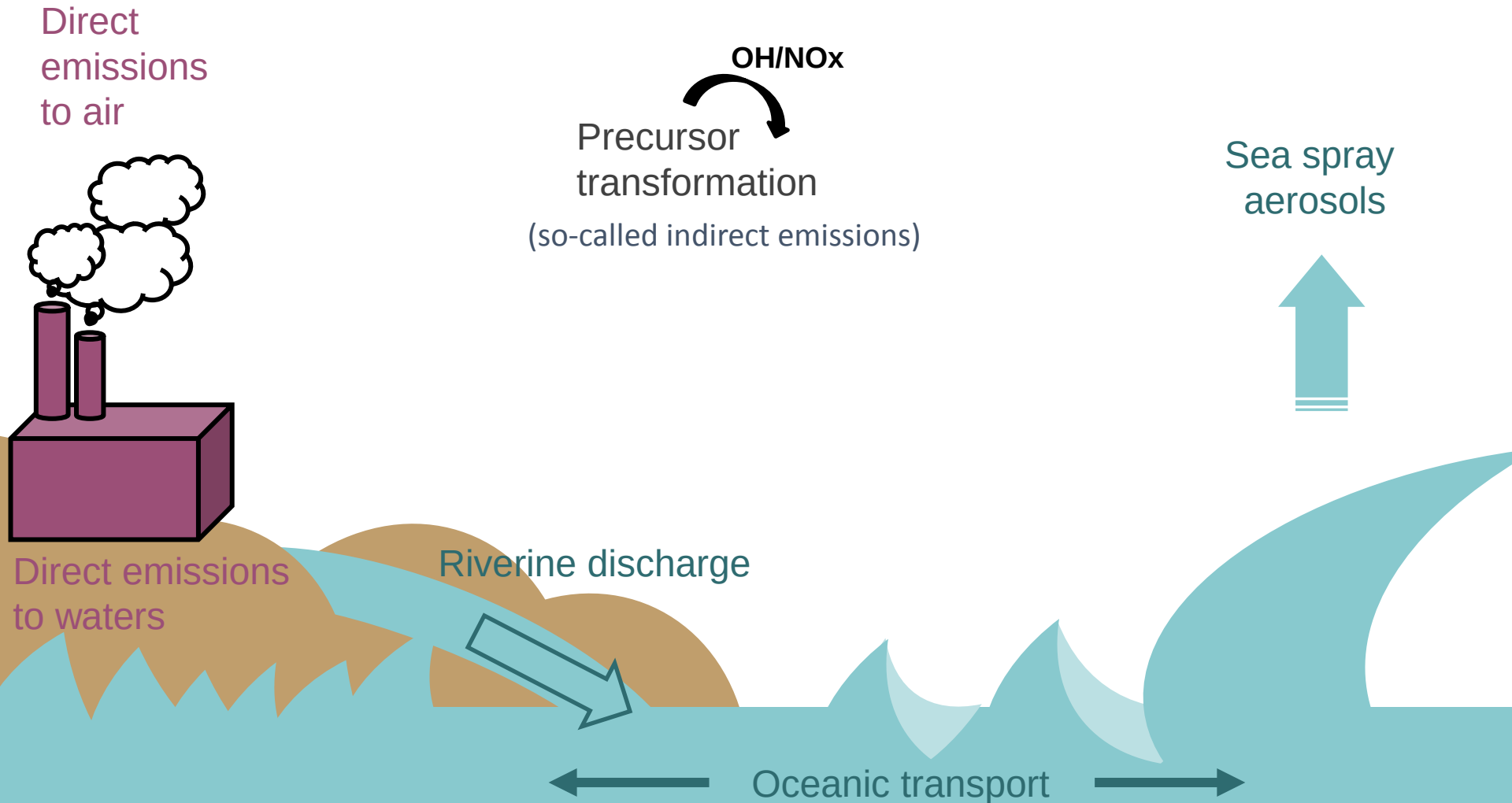




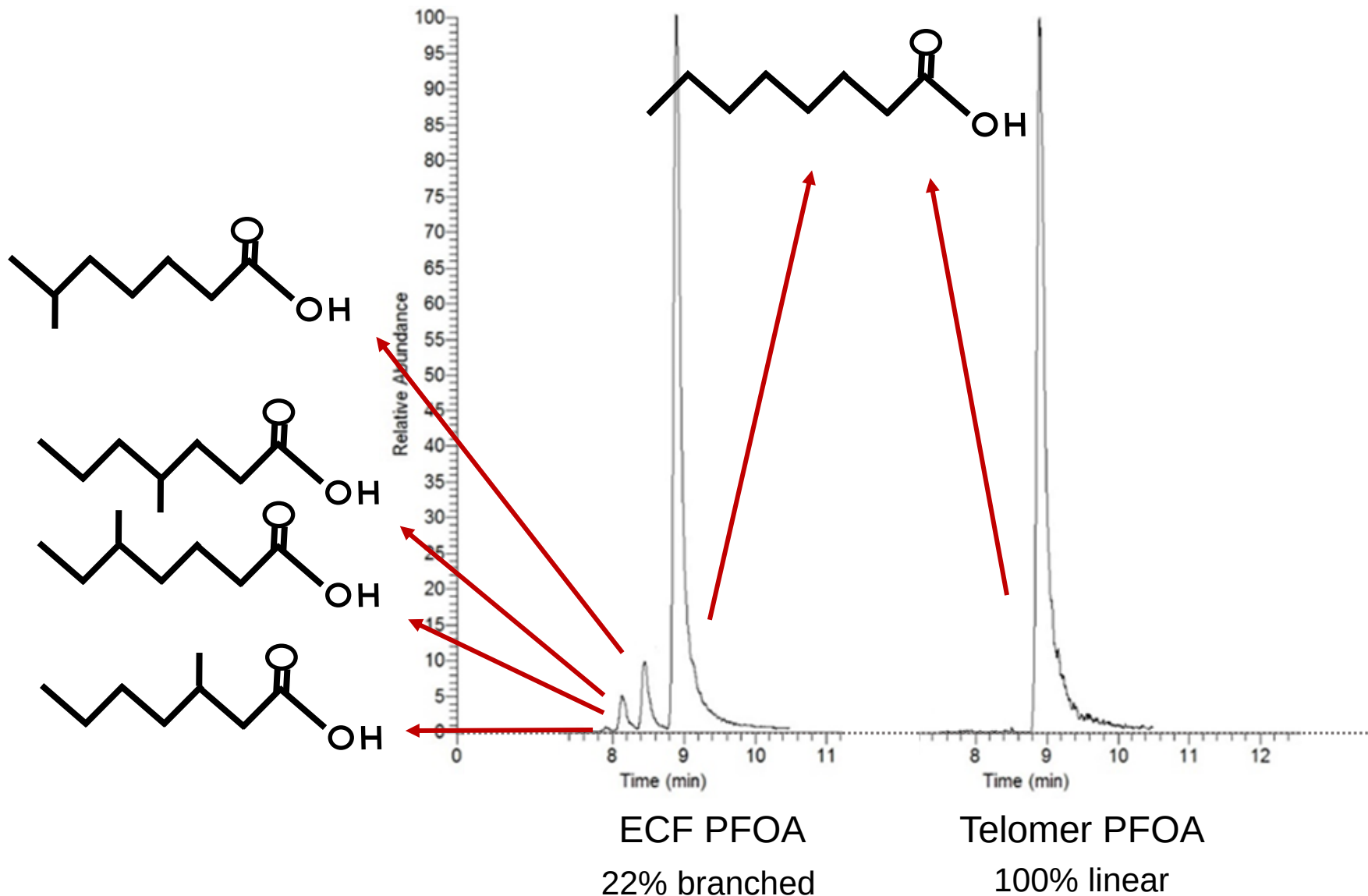
Are perfluoroalkyl acid isomer patterns useful markers of manufacturing origin in atmospheric samples?

Jana Johansson

Sources & transport processes

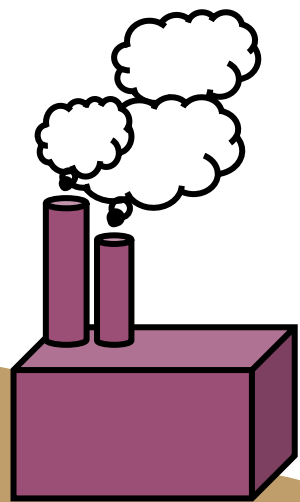


Structural isomers of PFOA



PFOA isomer composition of potential sources

20-26 % branched



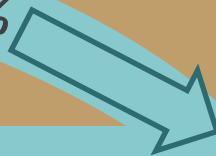
FTOH
OH/NO_x
100% linear

xFASA/Es
OH/NO_x
? % branched

? % branched



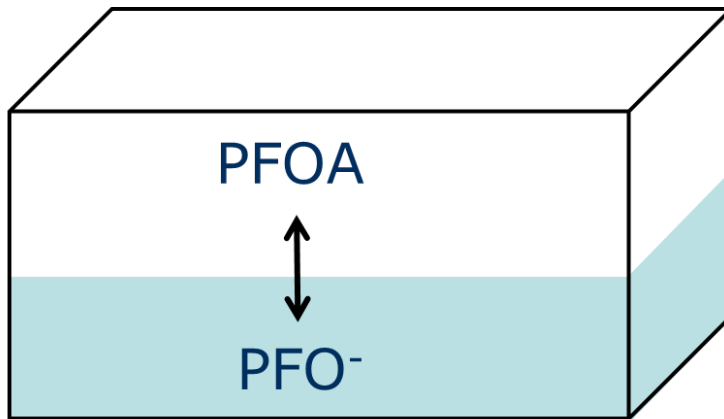
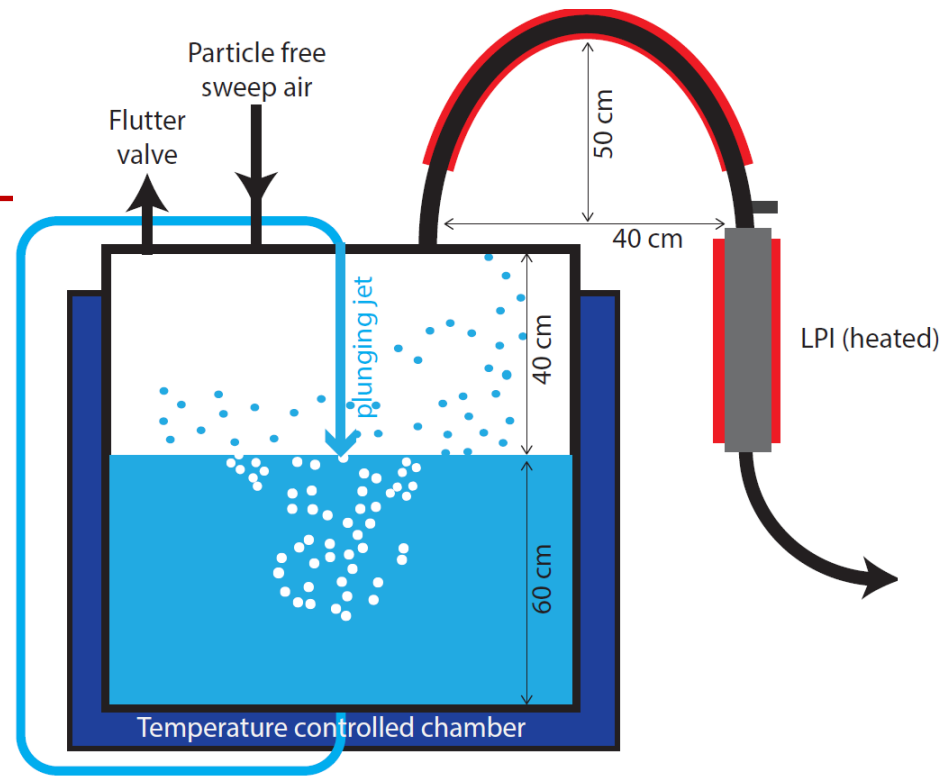
20-26 %



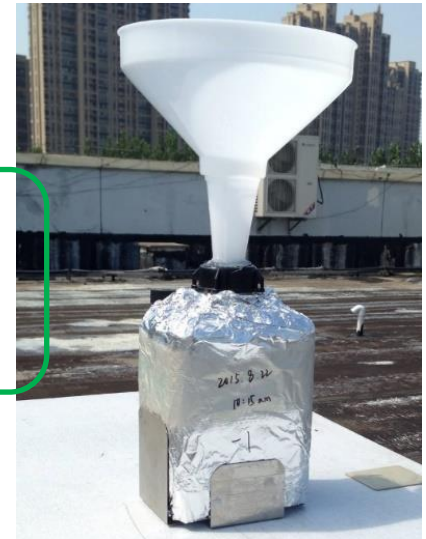
Study design

1. Laboratory studies Isomer fractionation

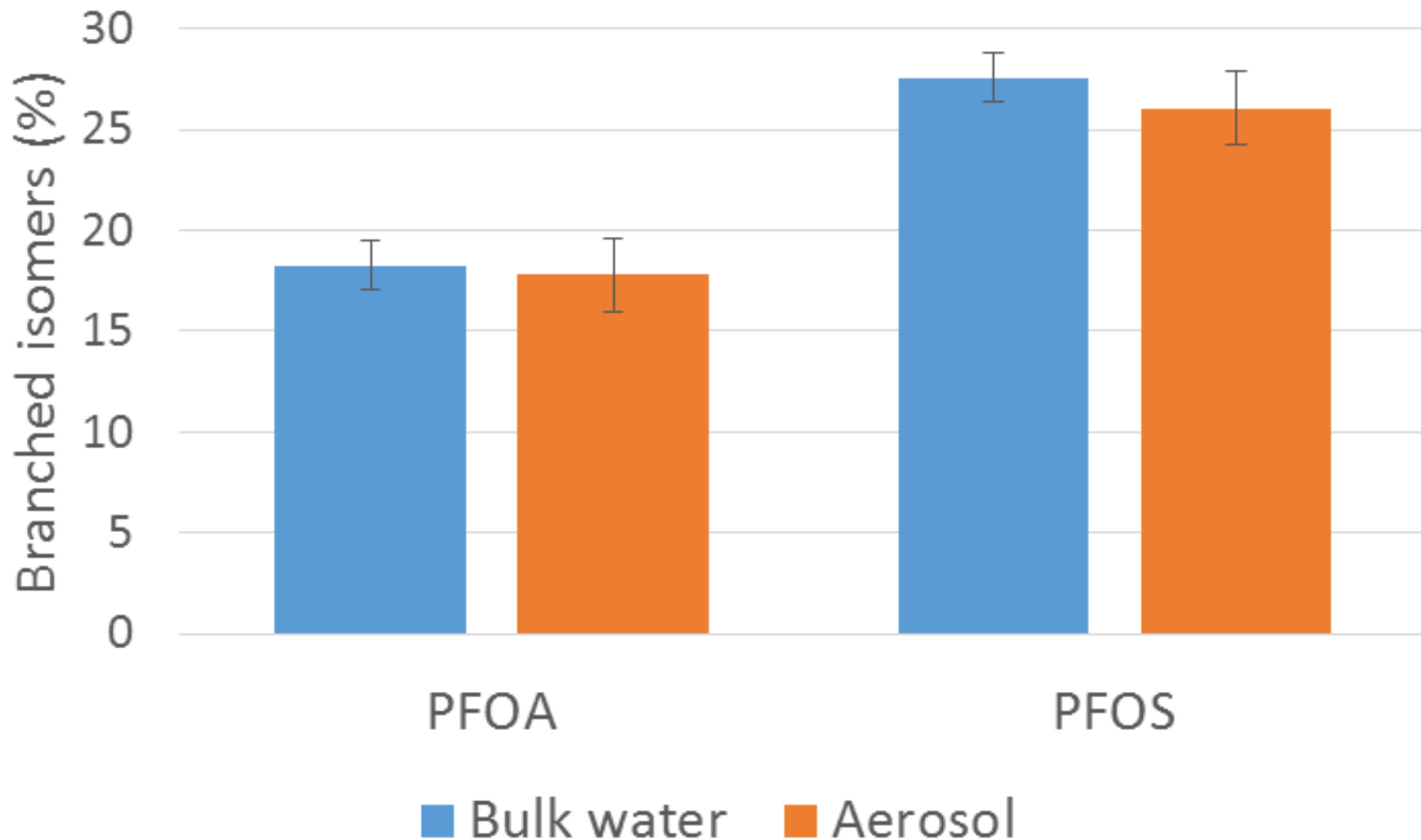
- a) Sea spray formation →
- b) Volatilisation
Using method developed by
Vierke et al. (2012).



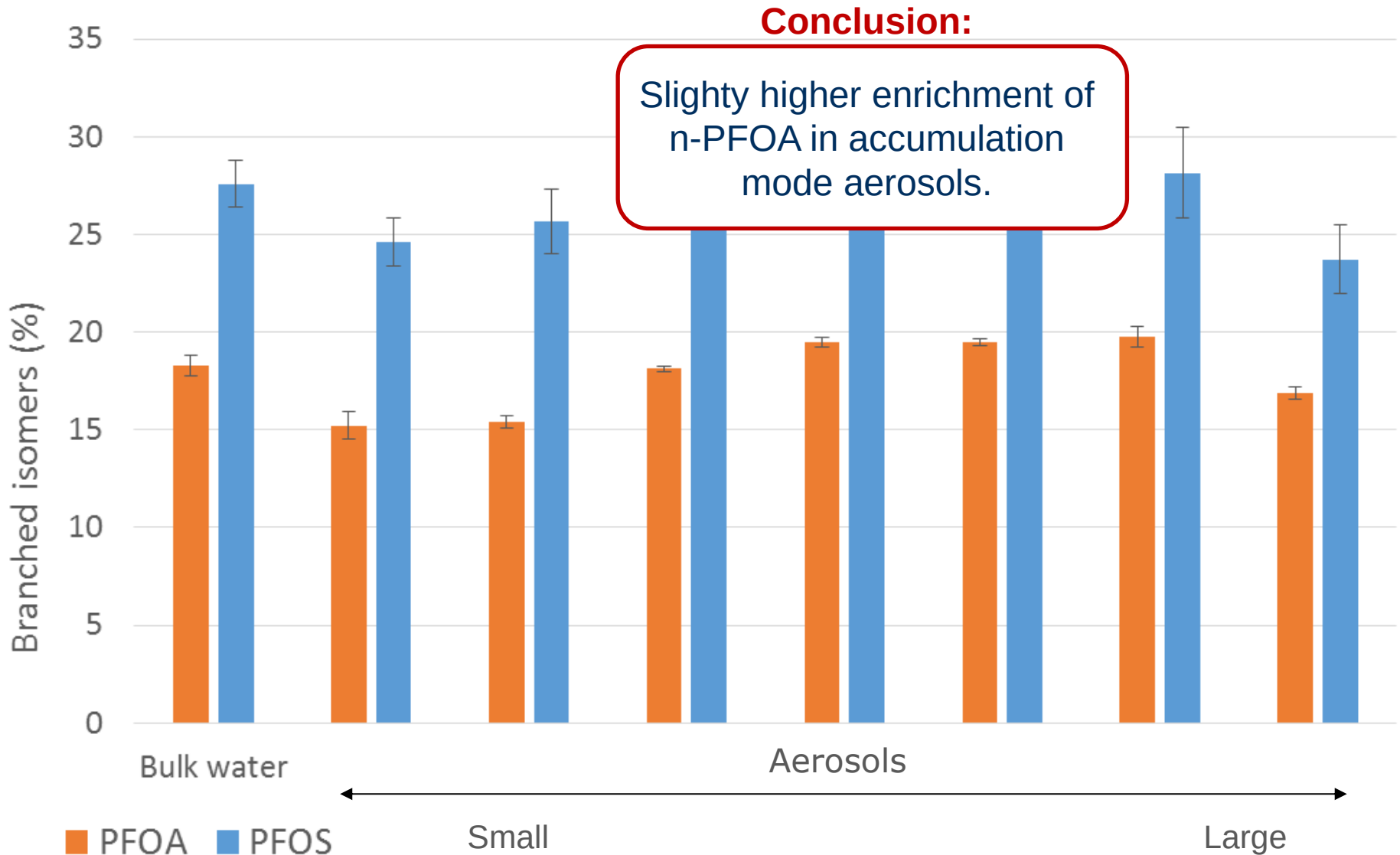
2. Field study Deposition



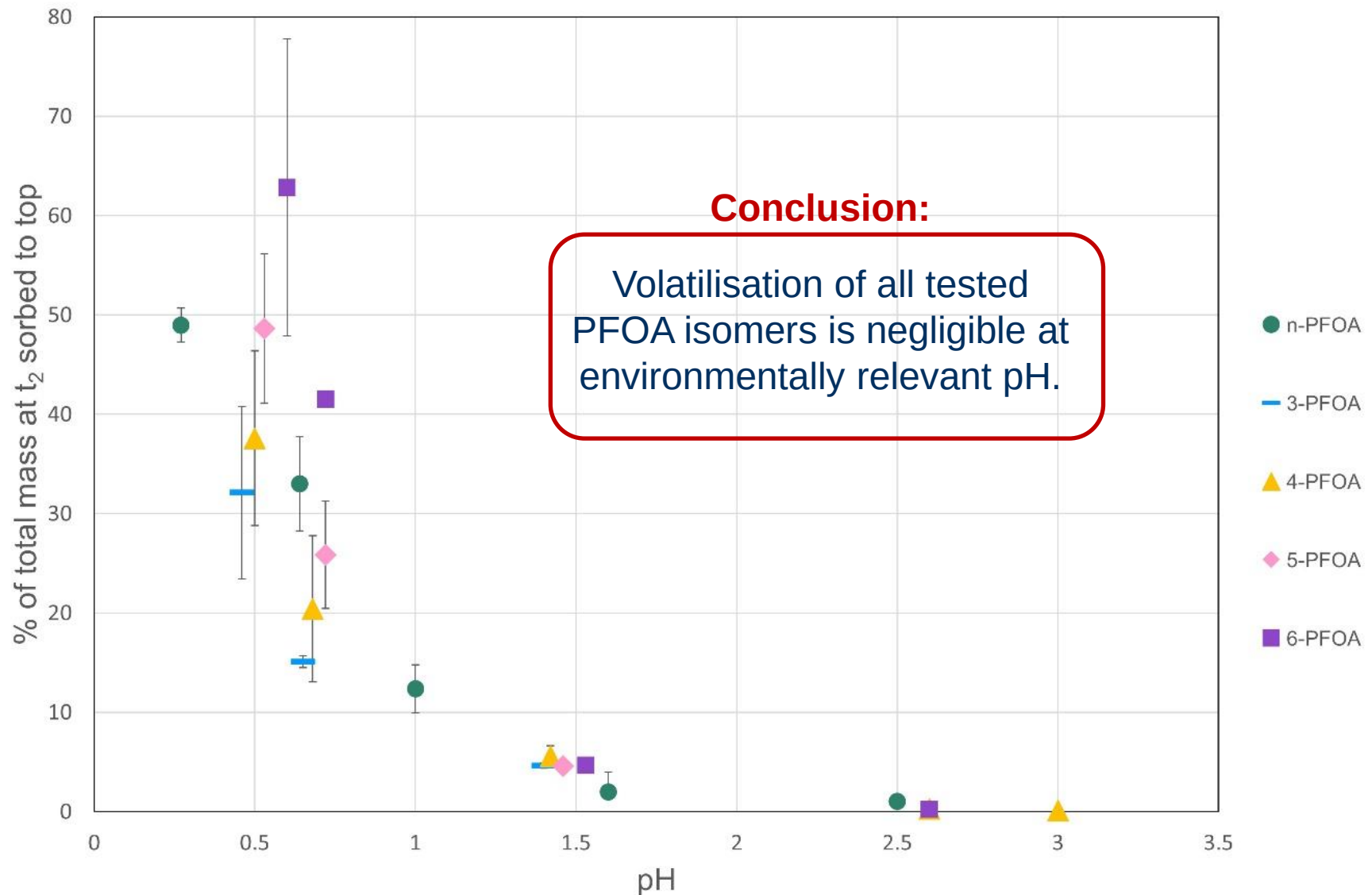
Lab study – Sea spray formation



Method evaluation – Sea spray formation

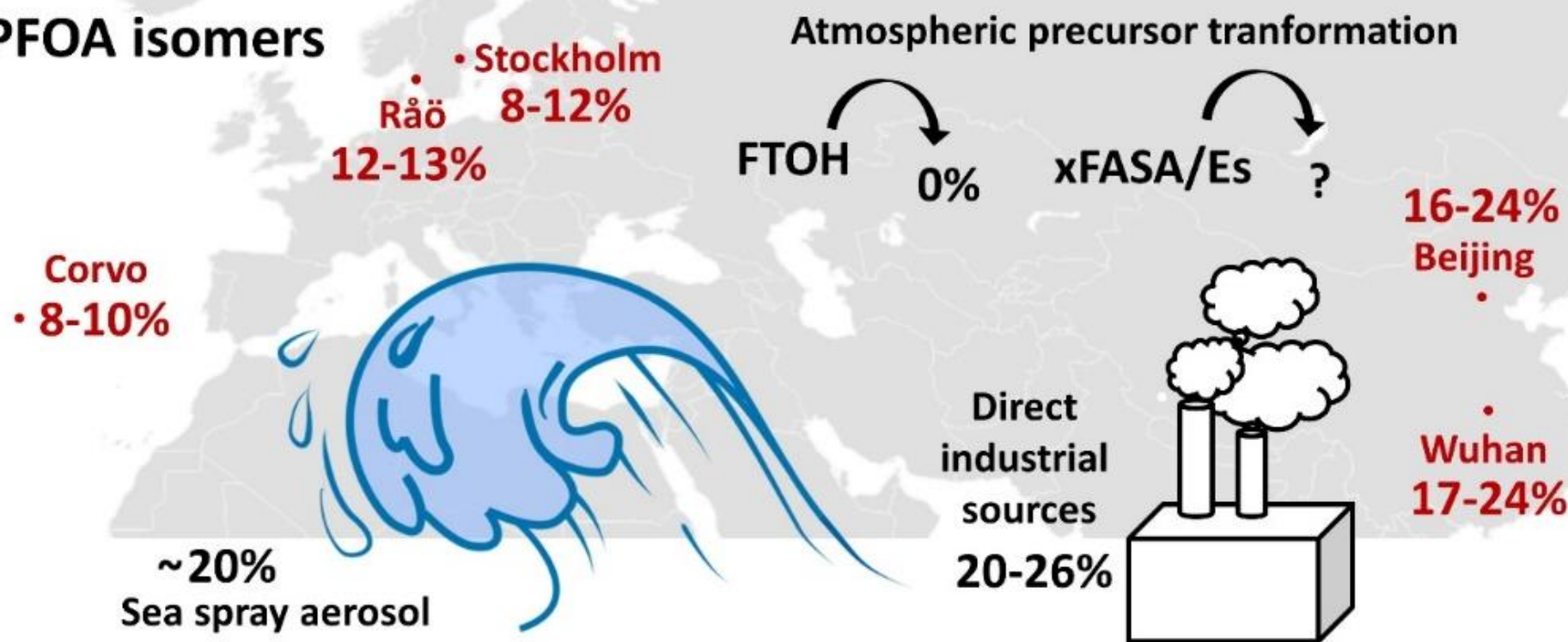


Lab study - volatilisation



Field study: Source elucidation through analysis of isomer patterns

Contribution of branched PFOA isomers



Conclusion:

Direct emissions from manufacturing and use of ECF PFOA dominate in China, whereas European sites are influenced by both telomer and ECF sources.

The strategy is useful but..

Additional markers are needed to distinguish between different types of ECF sources.

Enrichment in sea spray aerosols may lead to a slight fractionation (needs further investigation).

Fractionation in emissions from direct sources are not known.

Thanks for your attention

Acknowledgements:

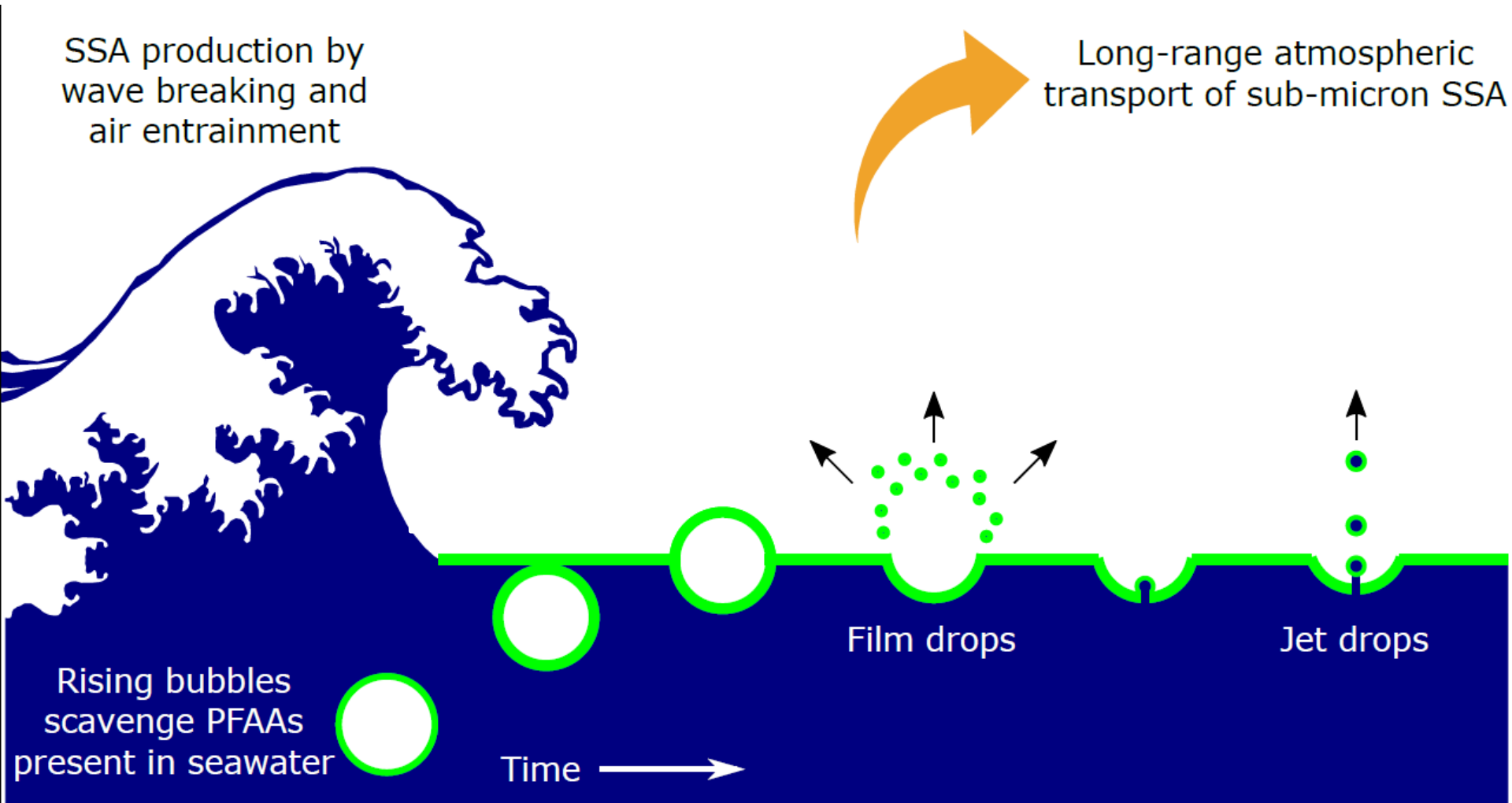
Co-authors

Ian Cousins, Urs Berger, Matthew Salter, Yali Shi, Hong Yan

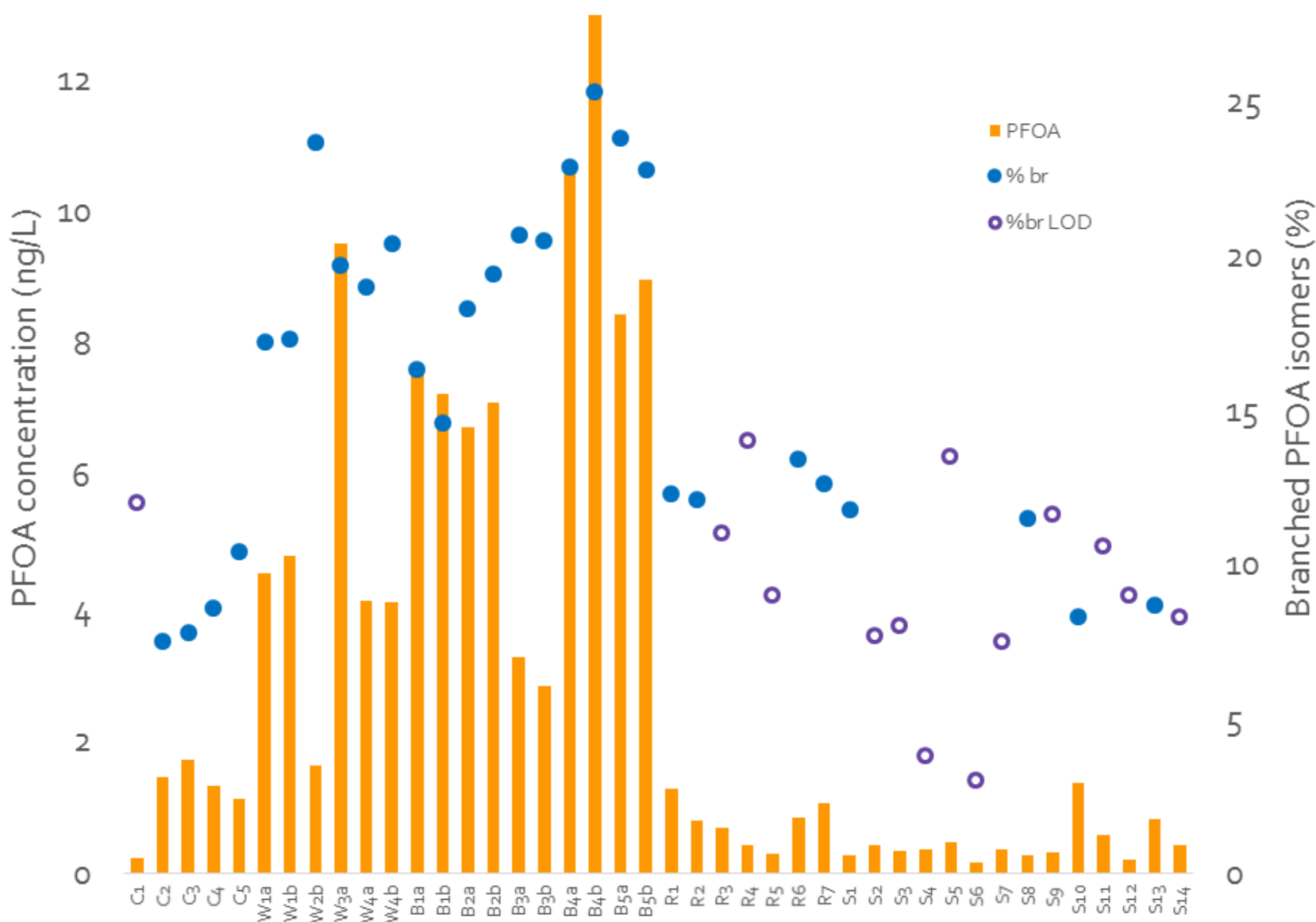
Funding

Formas

Ocean-to-air transfer via sea spray aerosol (SSA)



Field study: Source elucidation through analysis of isomer patterns



Water-to-air transfer of branched and linear PFOA: Influence of pH, concentration and water type

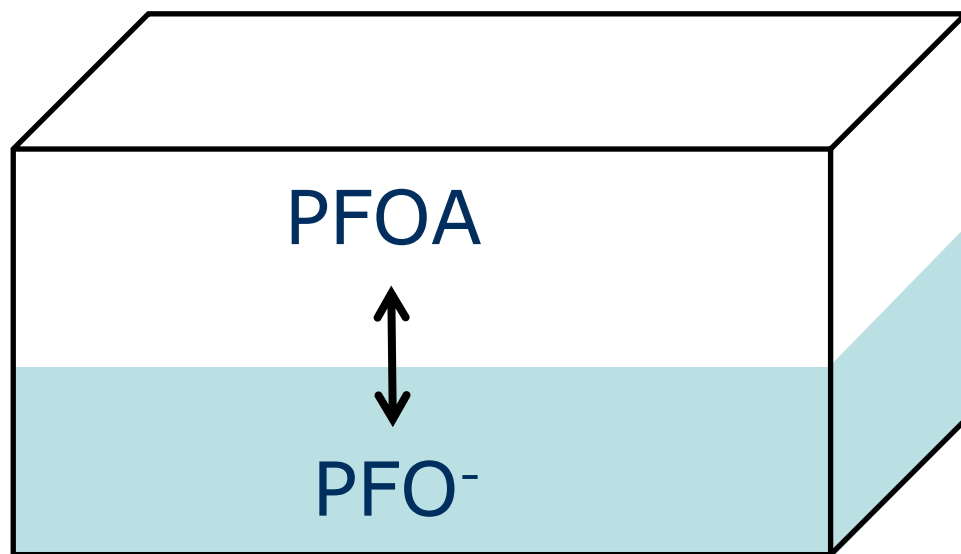


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Method developed by Vierke et al. (2012).