

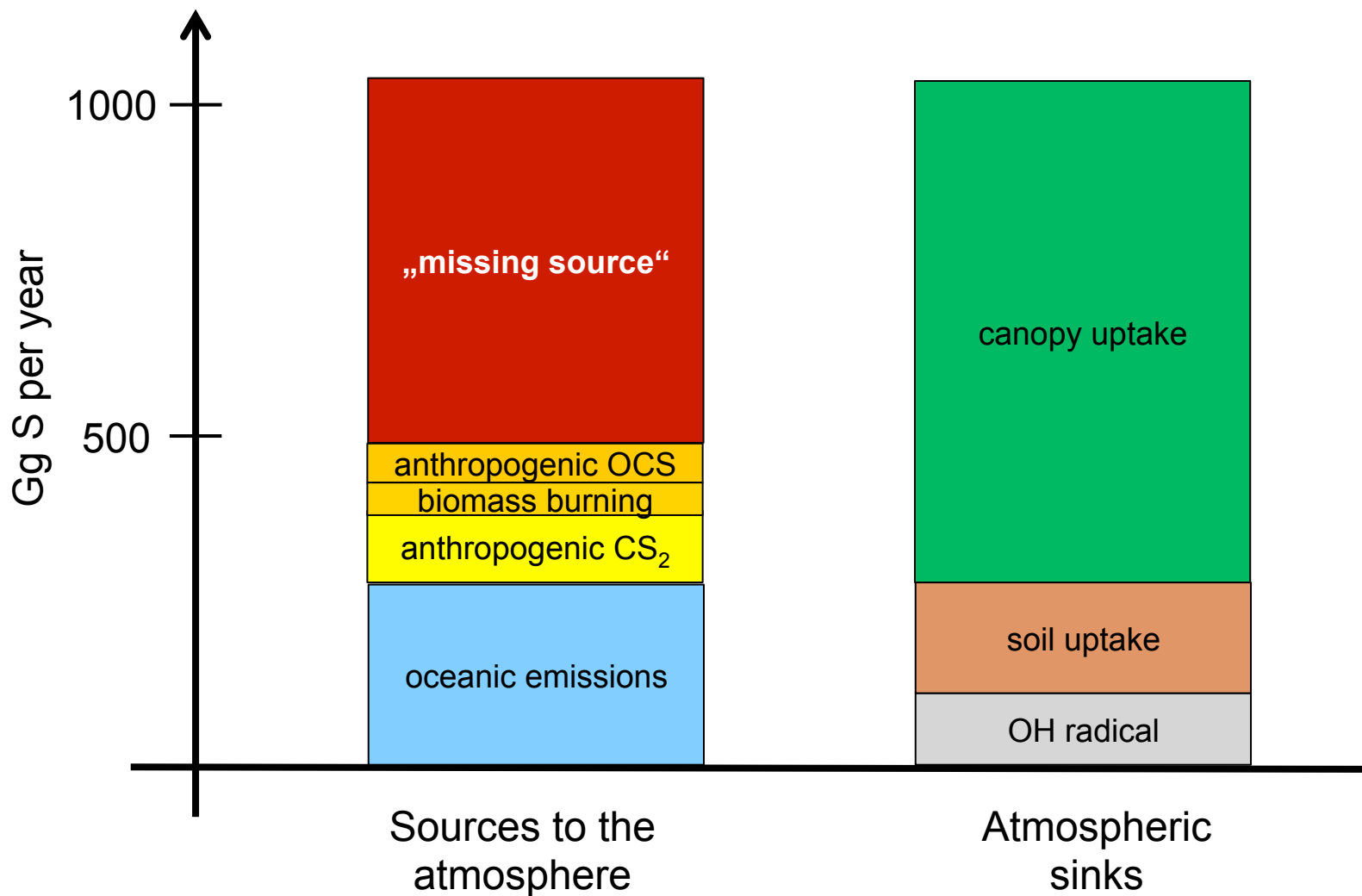


The role of the ocean in the atmospheric budget of carbonyl sulfide

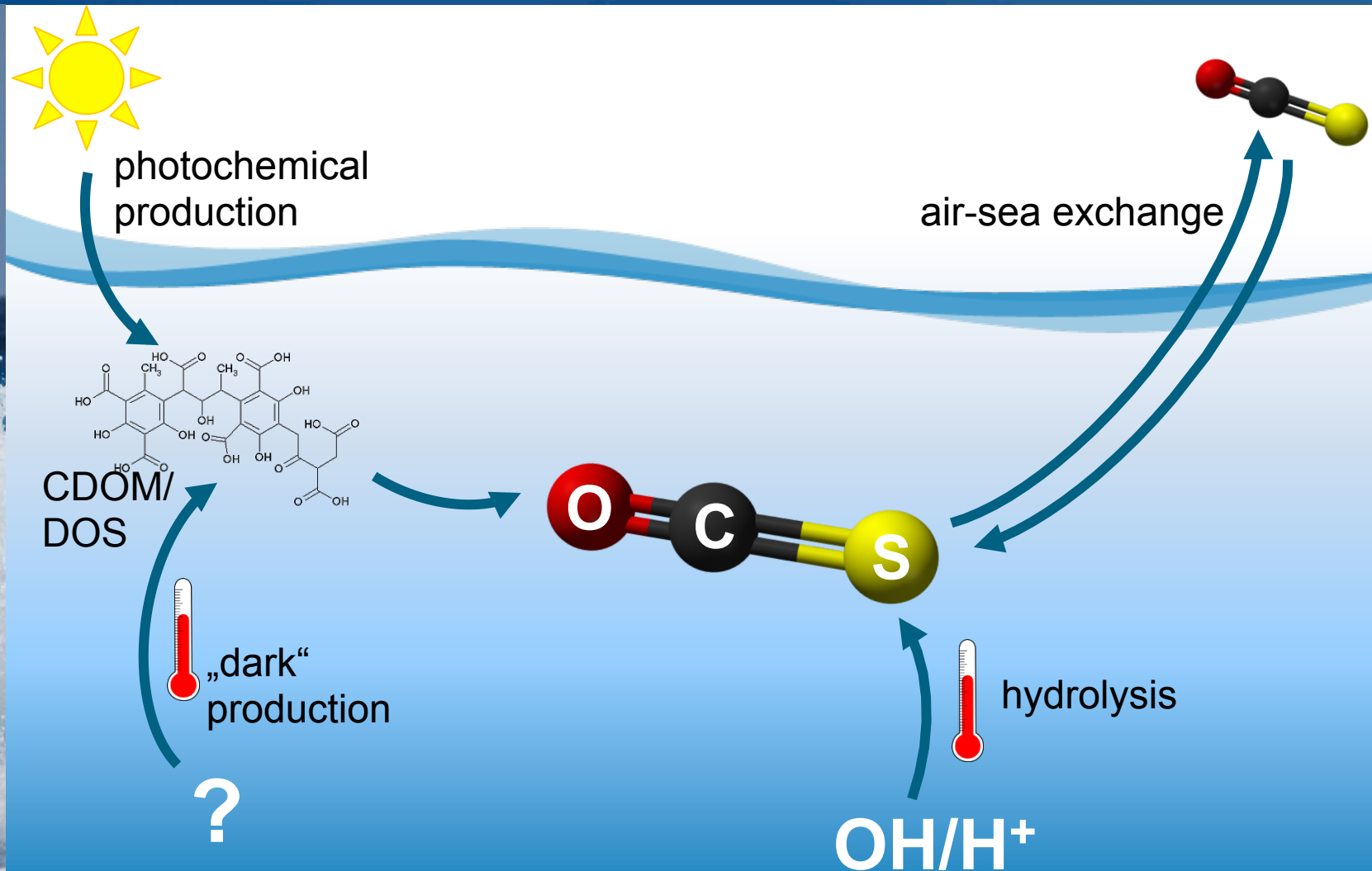
Sinikka T. Lennartz,

C. A. Marandino, M. von Hobe, P. Cortés, R. Simó, D. Booge, B. Quack, R. Röttgers,
K. Ksionzek, B. P. Koch, A. Bracher, and K. Krüger

The „missing source“ of OCS



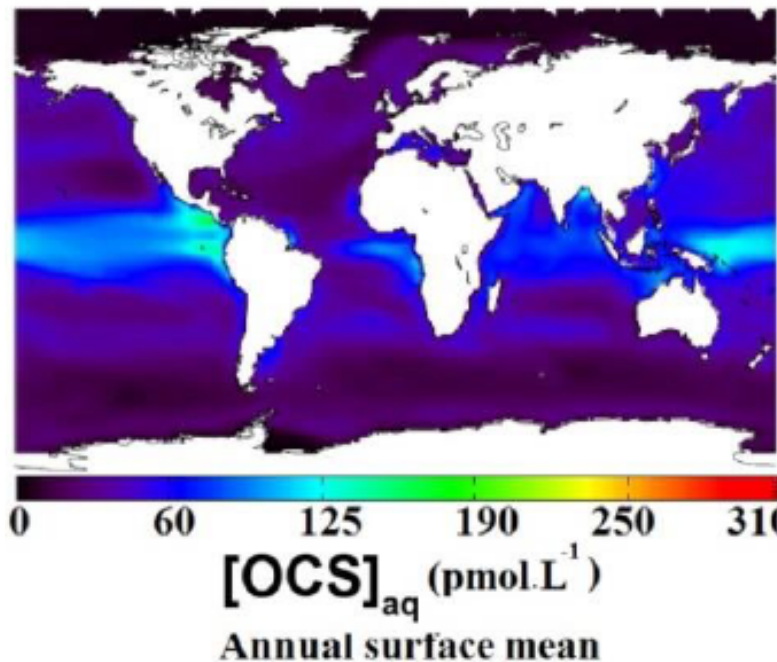
OCS in the ocean



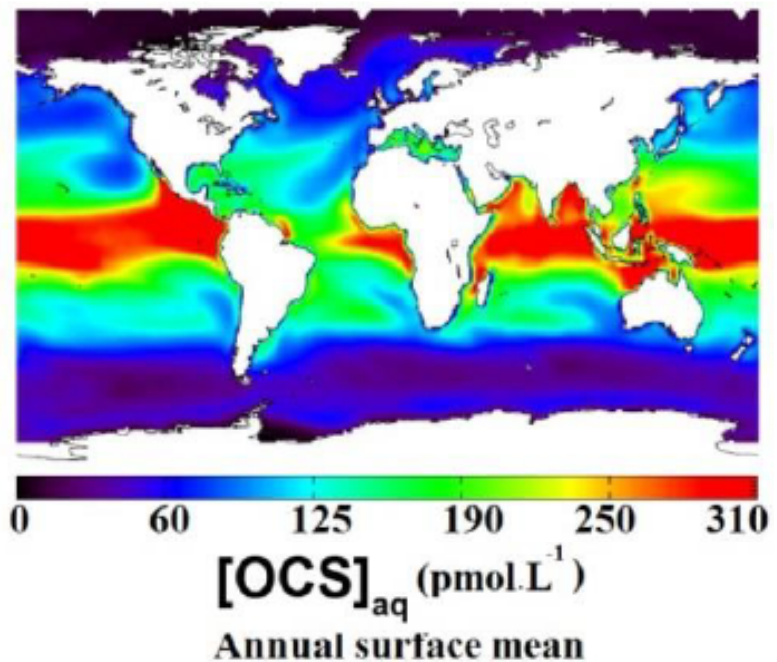
The missing source of OCS

Modelled bottom-up approach:

low scenario



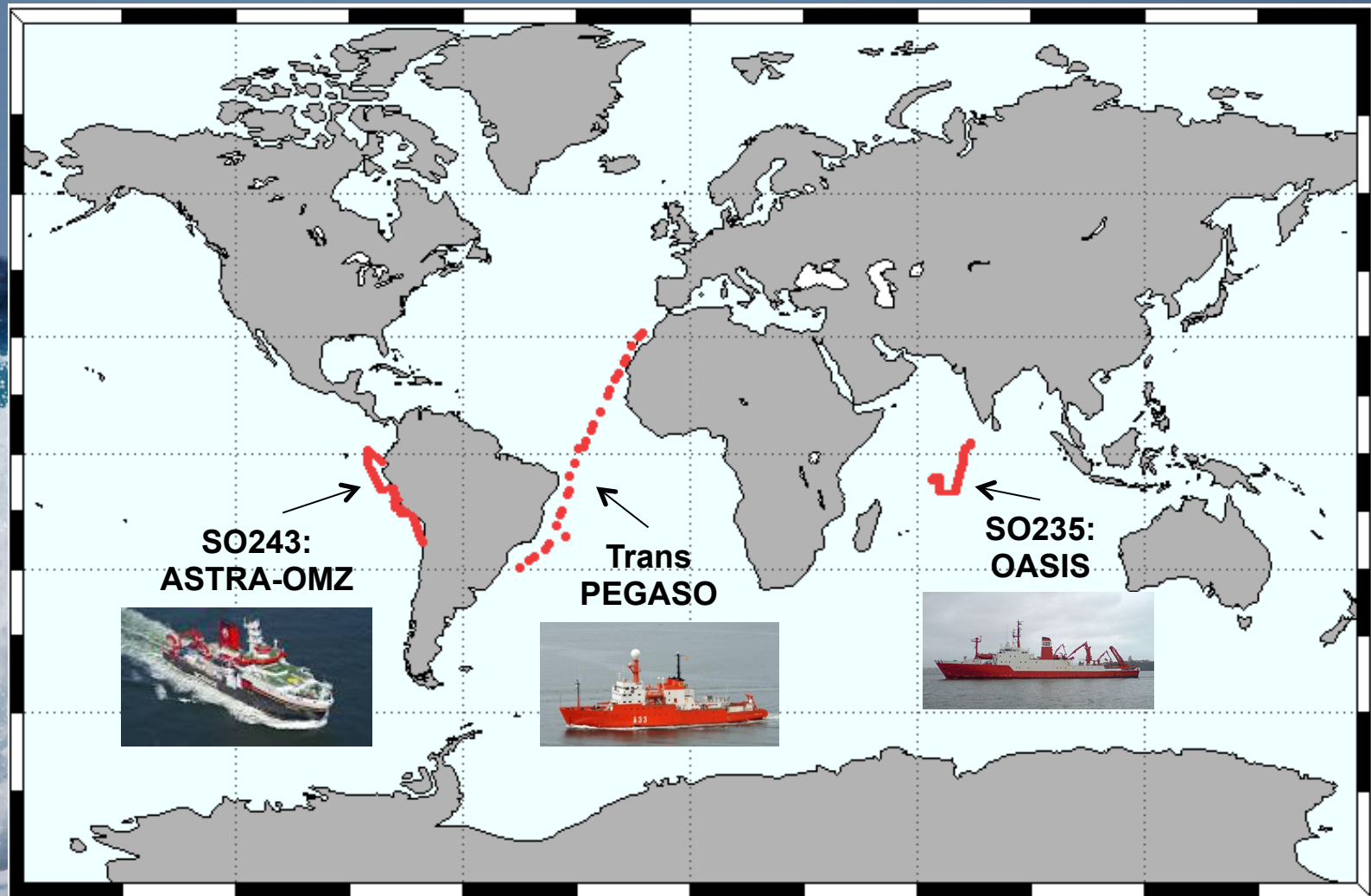
high scenario



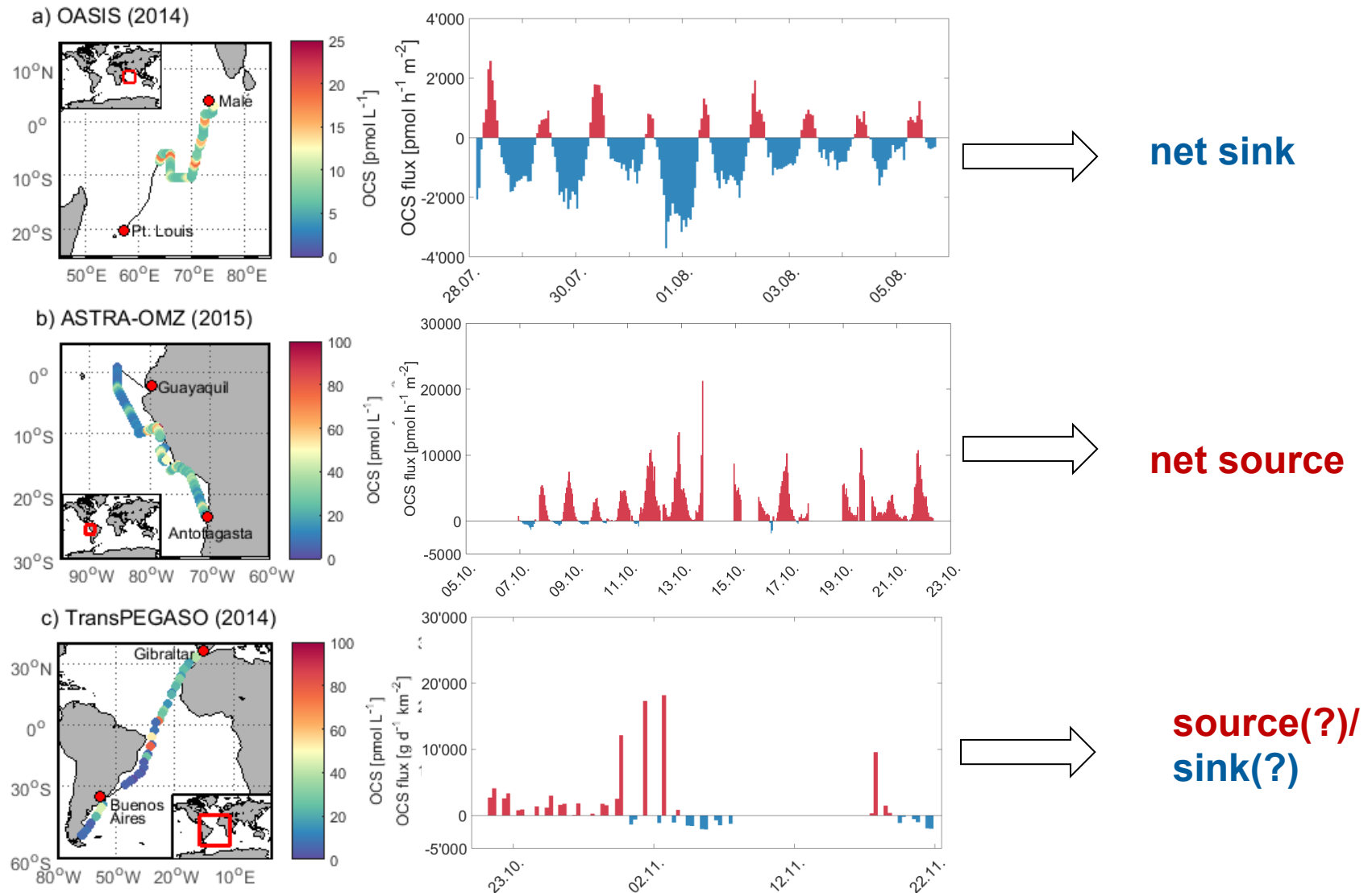
modified after Launois et al., 2015

⇒ Direct oceanic emissions between 537 and 3997 Gg S per year

Can the tropical ocean account for the missing source?



Direct OCS emissions



Box modelling of OCS concentrations

dC/dt

photoproduction

U_{dark}

dark
production

CD_{dark}

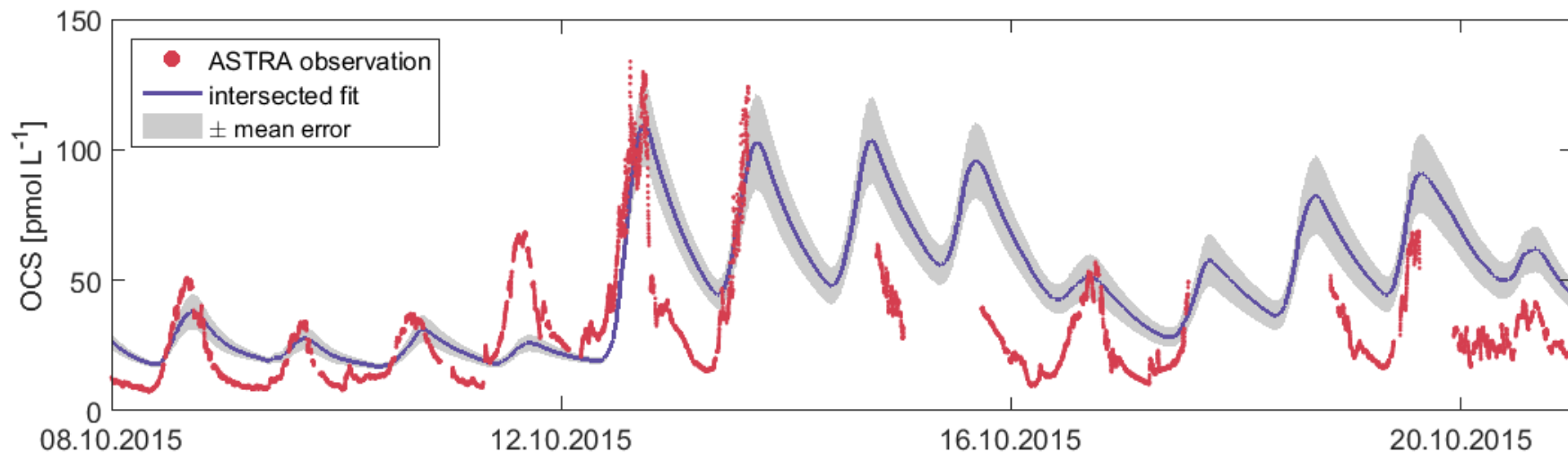
hydro-
lysis

ρH

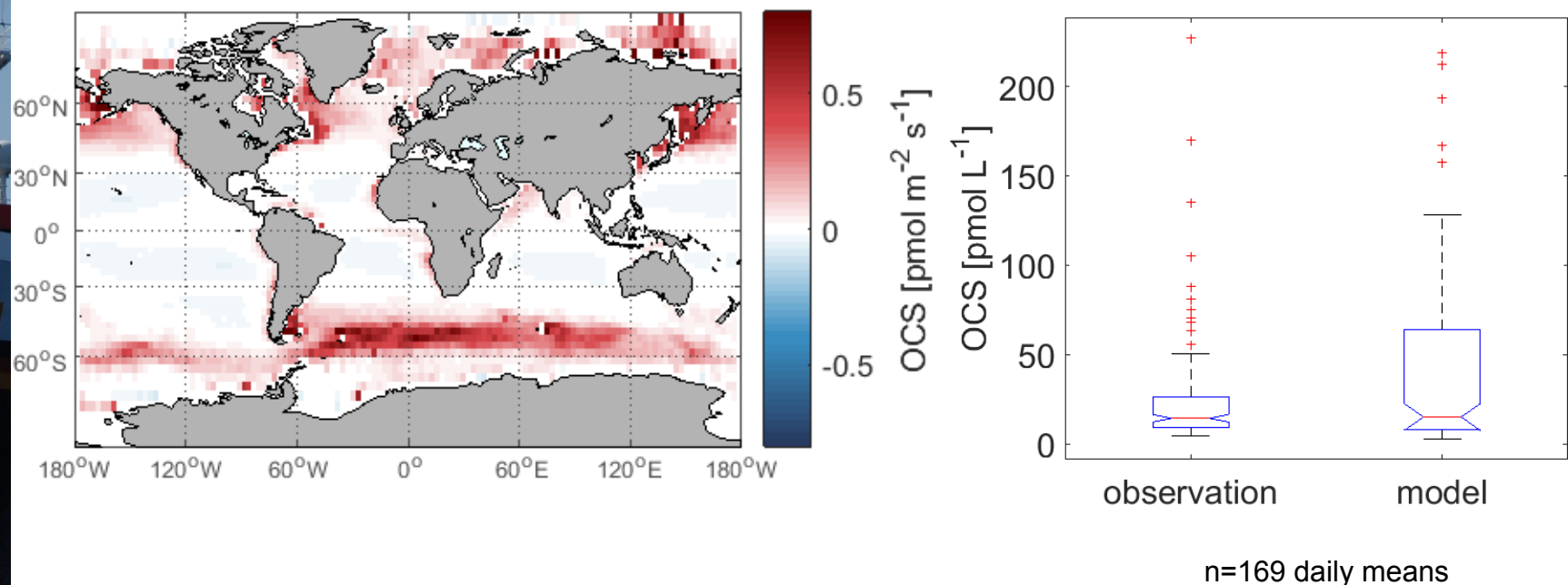
gas exchange

C_{air}

Parametrizations: von Hobe et al., 2003



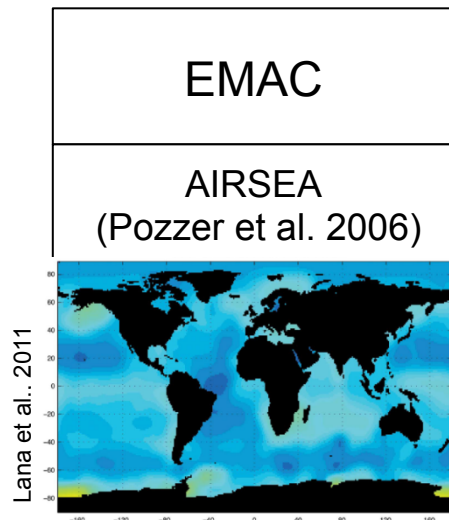
Box modelling of OCS concentrations



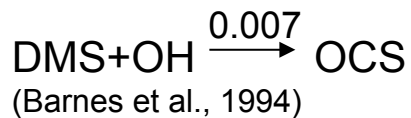
oceanic direct OCS emissions: 9.8 Gg S per year

Contribution of indirect emissions

DMS

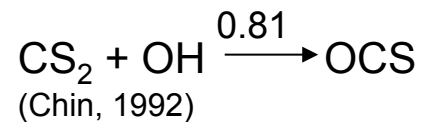
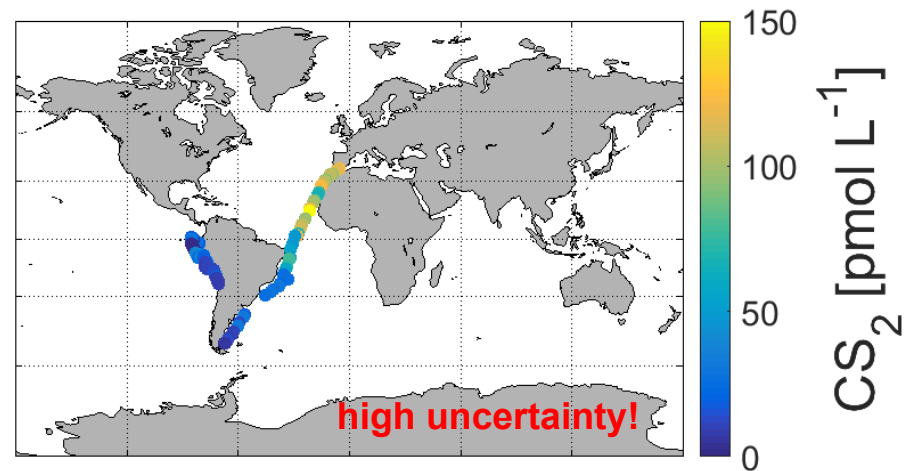


**high
uncertainty!**



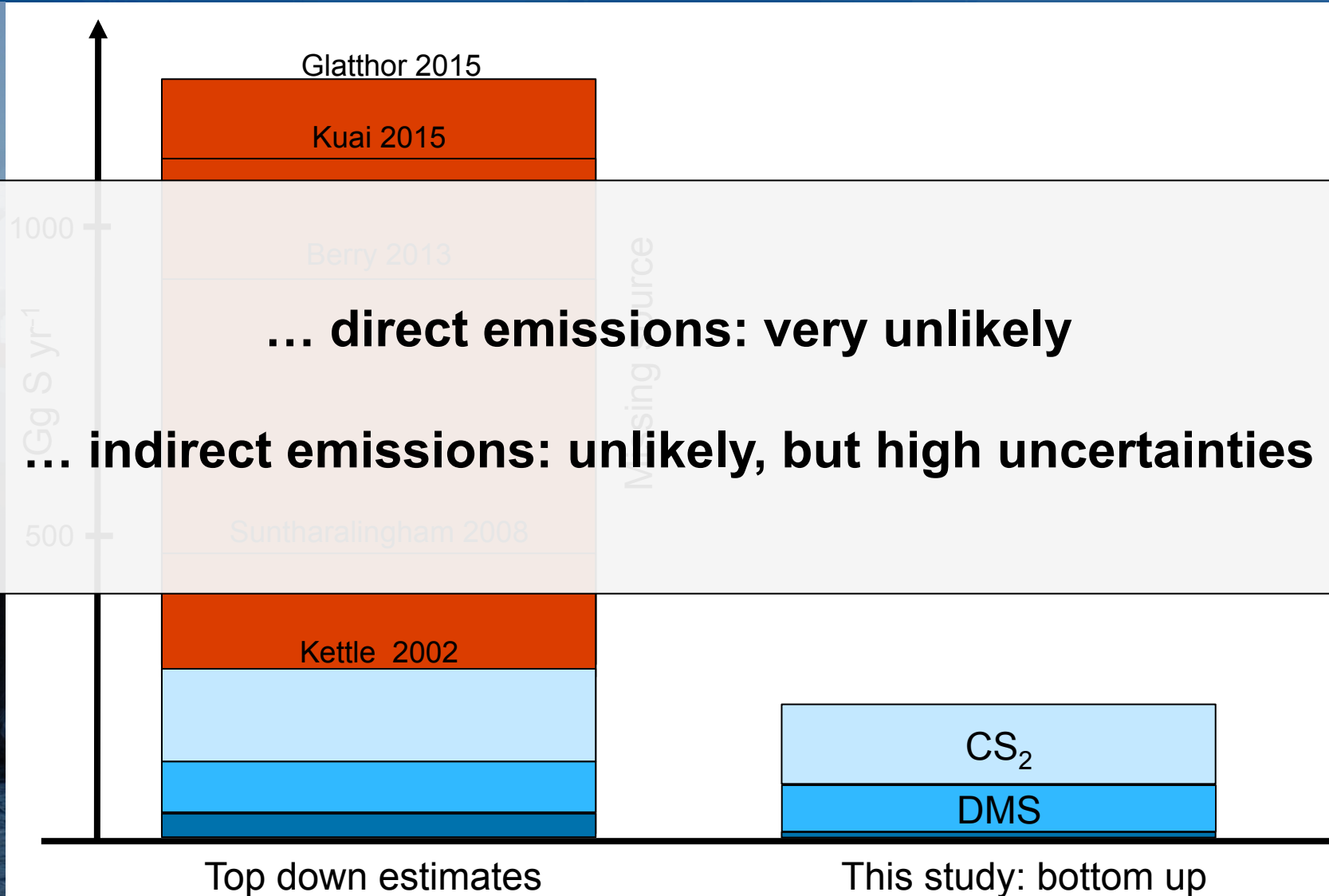
77.7 Gg S/yr OCS

CS₂



132 Gg S/yr OCS

Does the ocean account for the missing source?



Outlook

- Oceanic emissions:
 - photochemistry OCS/CS₂: FDOM analysis
 - incubation experiments for CS₂
 - more field observations
- Generally:
Atmospheric budget of OCS may need revision

Thank you for your attention!

Acknowledgements:

- Project ROMIC-THREAT, TRACE-EC (YIG Prof. Marandino), TransPEGASO, BMBF SONNE: OASIS-SONNE and ASTRA-OMZ
- Contributors to OCS oceanic database: M.O. Andreae, G. Uher, V. Ulshöfer, O. Flöck, G. Cutter, M. von Hobe, X. Xu, H. Bingemer
- CS₂ measurements during ASTRA-OMZ: D. Booge, C. Schlundt
- ECMWF (ERAInterim) and NASA (AquaMODIS)



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