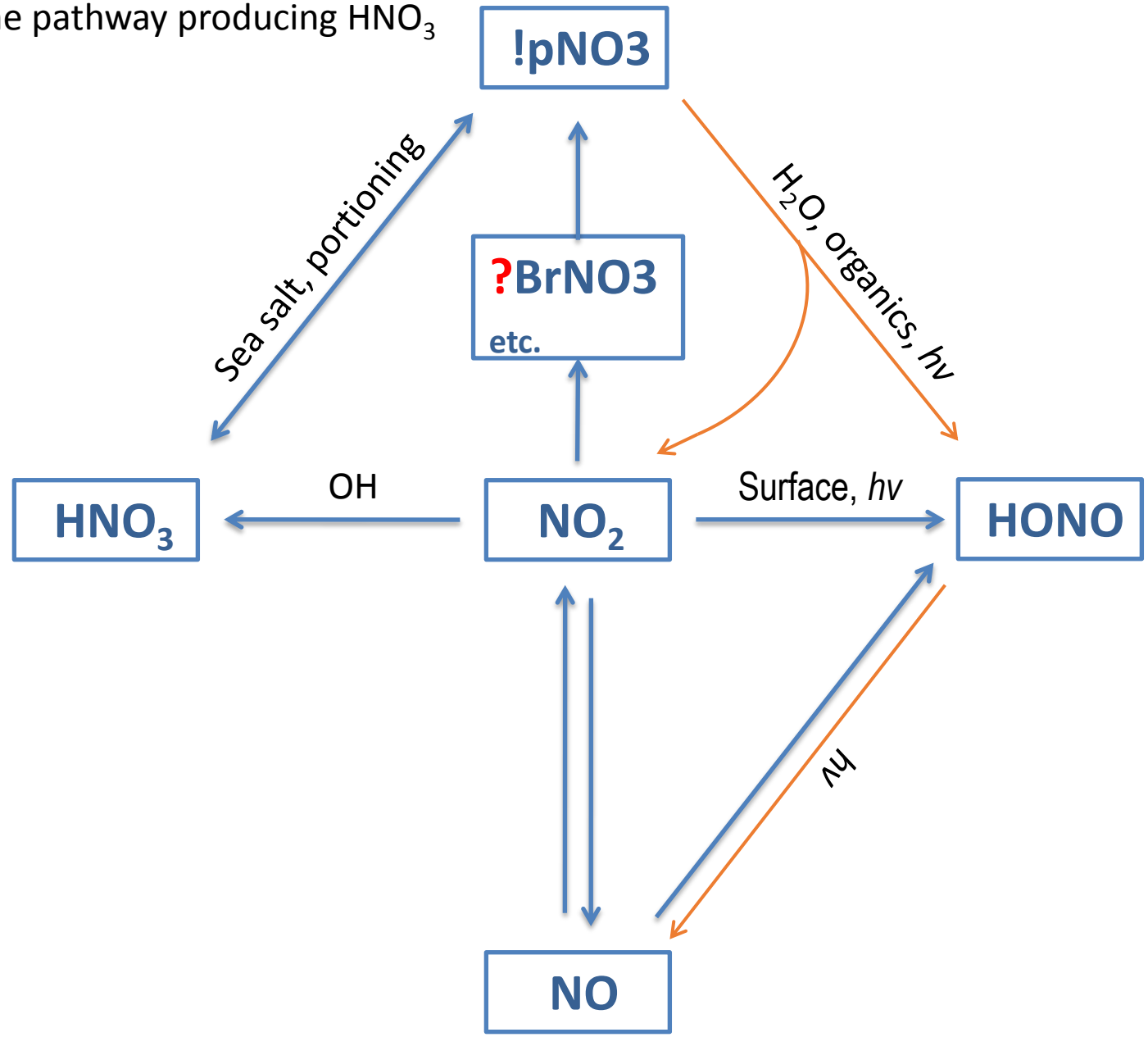
Novel N cycling over Atlantic

TropHONO Group

Traditionally, NO_2 is the precursor of HONO

Traditionally, NO_2 + OH is the pathway producing HNO_3

But……



A more accurate HONO budget

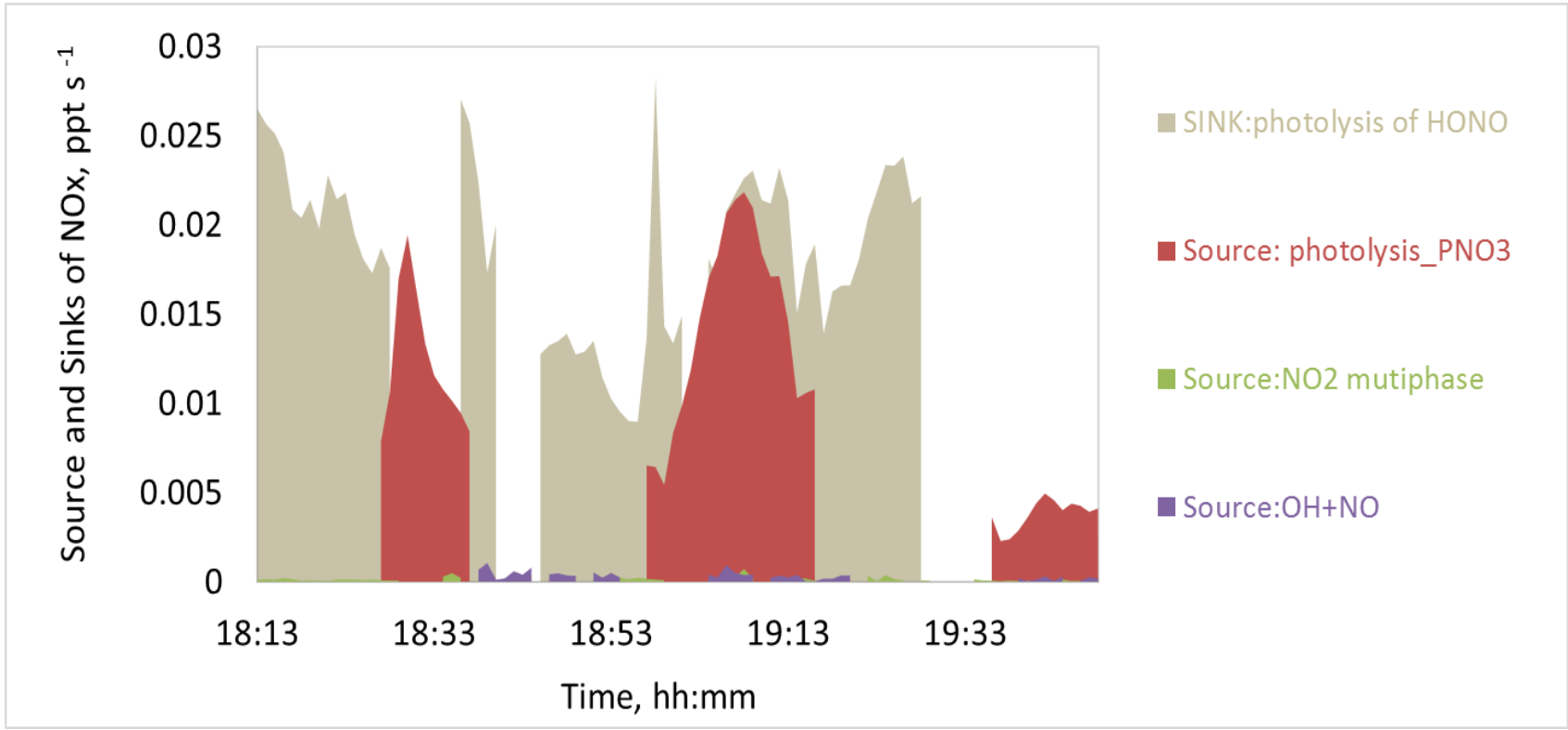
$$\frac{\partial HONO}{\partial t} = (P_{OH+NO} + P_{unknown} + P_{emis} + P_V + P_H)$$

$$-\left(L_{photolysis} + L_{OH+HONO} + L_{deposit}\right) \quad Equ\,(1)$$

Emission from ground surface, horizontal and convection transport are difficult to address

Question:
Surface sea water temperature? (Vs air temperature) to evaluate the height of mixing layer.

Using photolysis rate constant measured in our lab, the HONO budget is closed



An undone NOx budget

NOx Sinks:

$$NO_2 + OH \rightarrow HNO_3 \quad (1)$$

? $$NO_2 + BrO \rightarrow BrNO_3 \quad (2)$$

? $$(\mathrm{ROO})CH_3OO + NO \xrightarrow{<1\%} CH_3ONO_2 \quad (3)$$

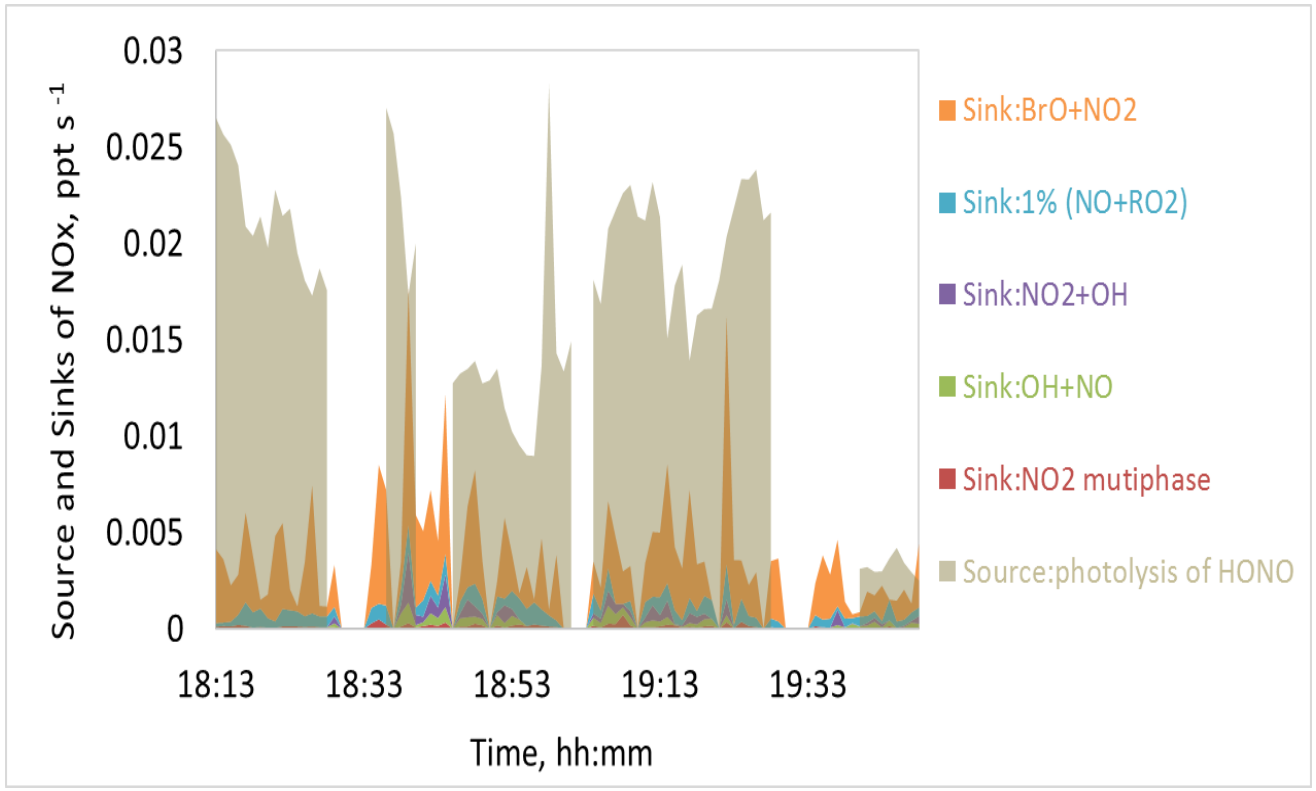
$$NO + OH \rightarrow HONO \quad (4)$$

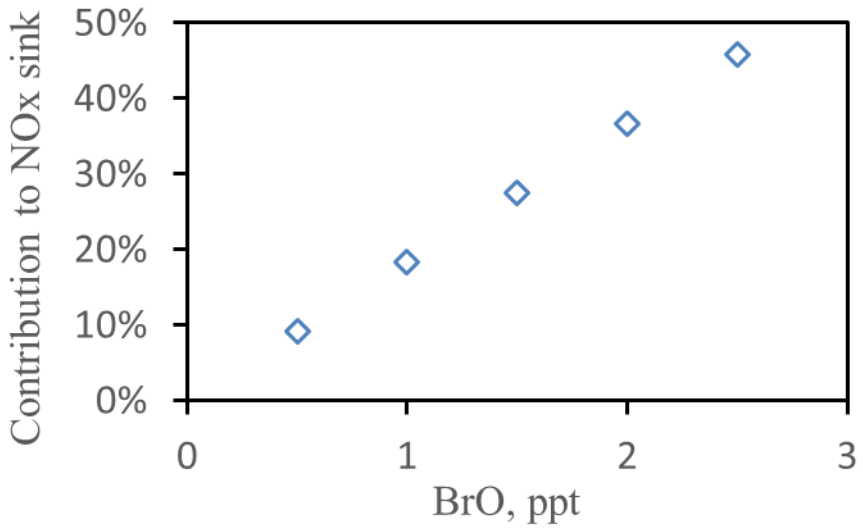
$$NO_2 + H_2O\ (or\ organics) \xrightarrow{surface} \ldots\ldots (5)$$

NOx Sources:

$$pNO_3 \xrightarrow{\lambda} \ldots\ldots \quad (6)$$

Looking forward to NOx and BrO from Andy and Jochen.





Uncertainty:
With preliminary NOx and assumption of 1 ppt BrO
100% CH3OO of ROO assumption