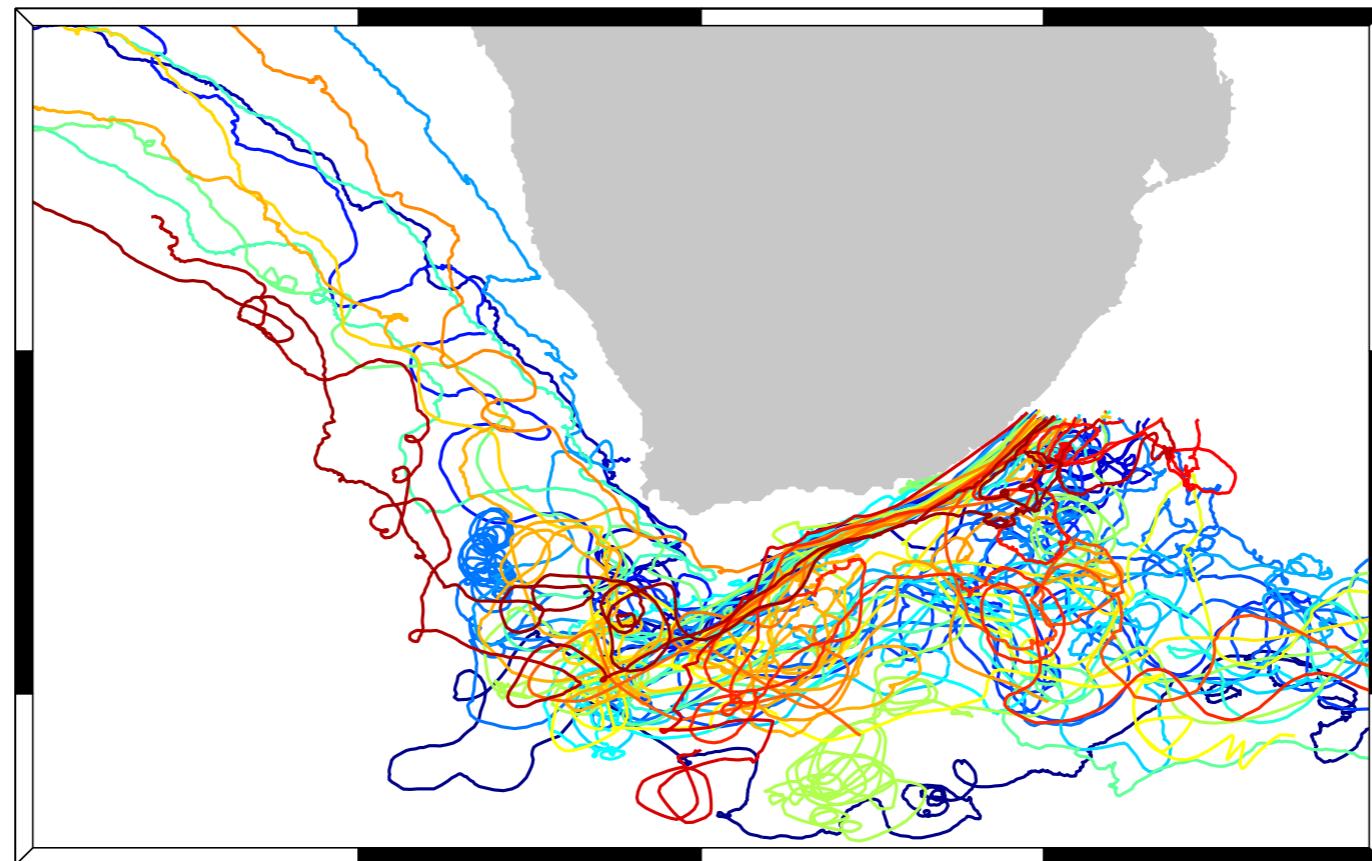


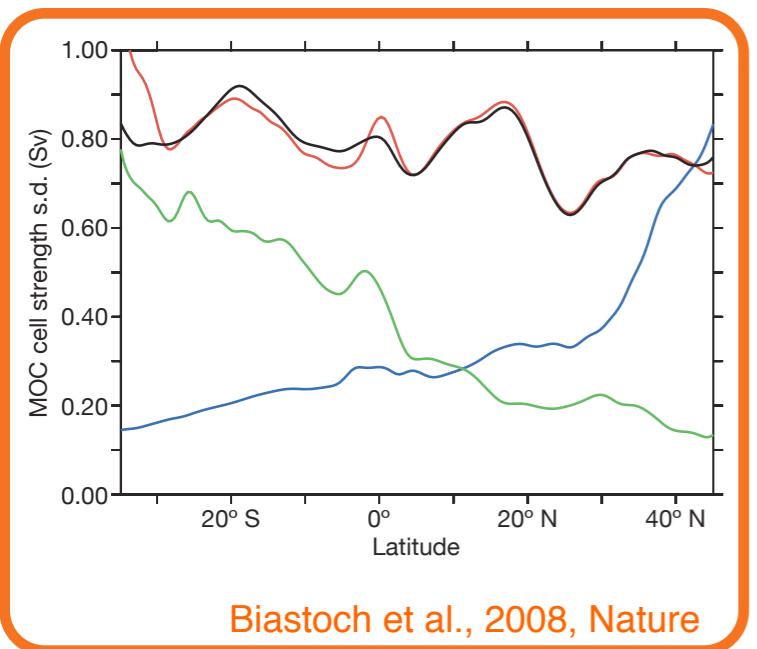
Assessing Agulhas leakage - The time needed to reach North Atlantic



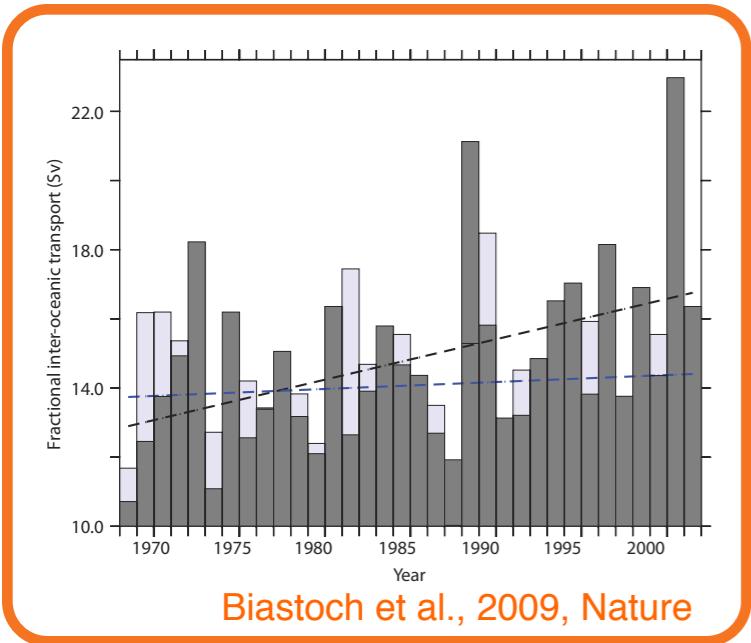
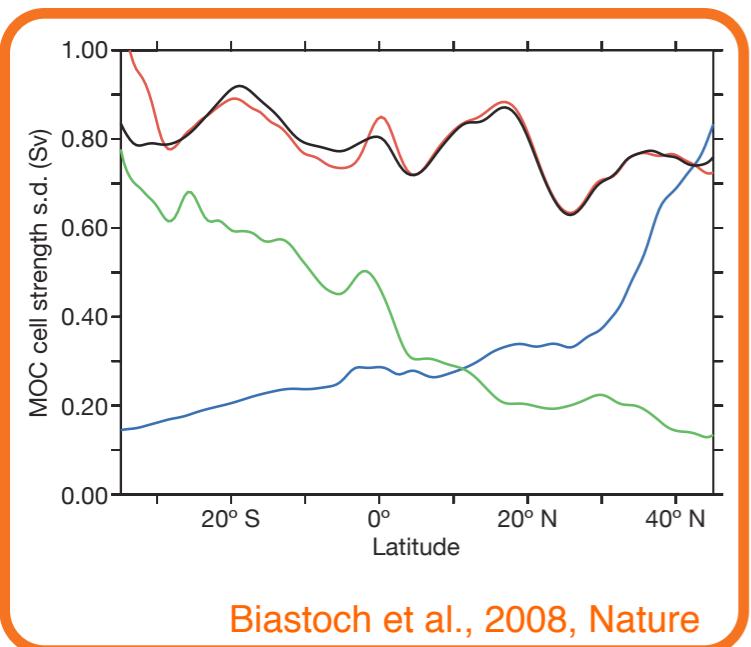
Erik van Sebille

in joint effort with Bill Johns and Lisa Beal

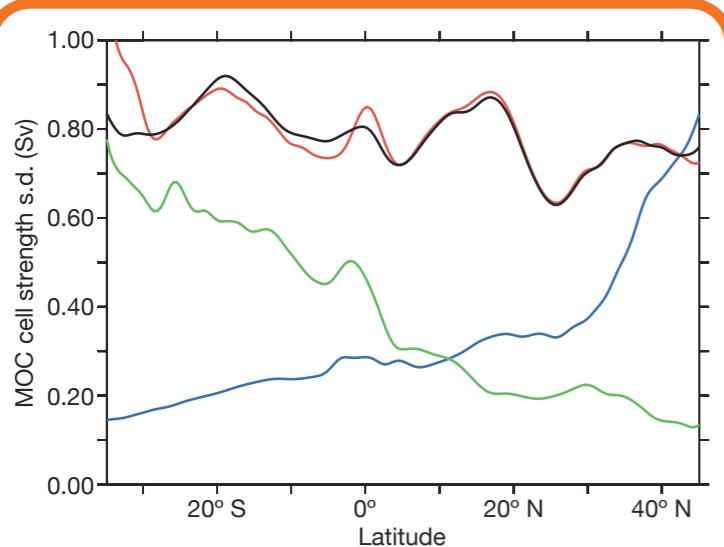
Advection time scales in the Atlantic Ocean



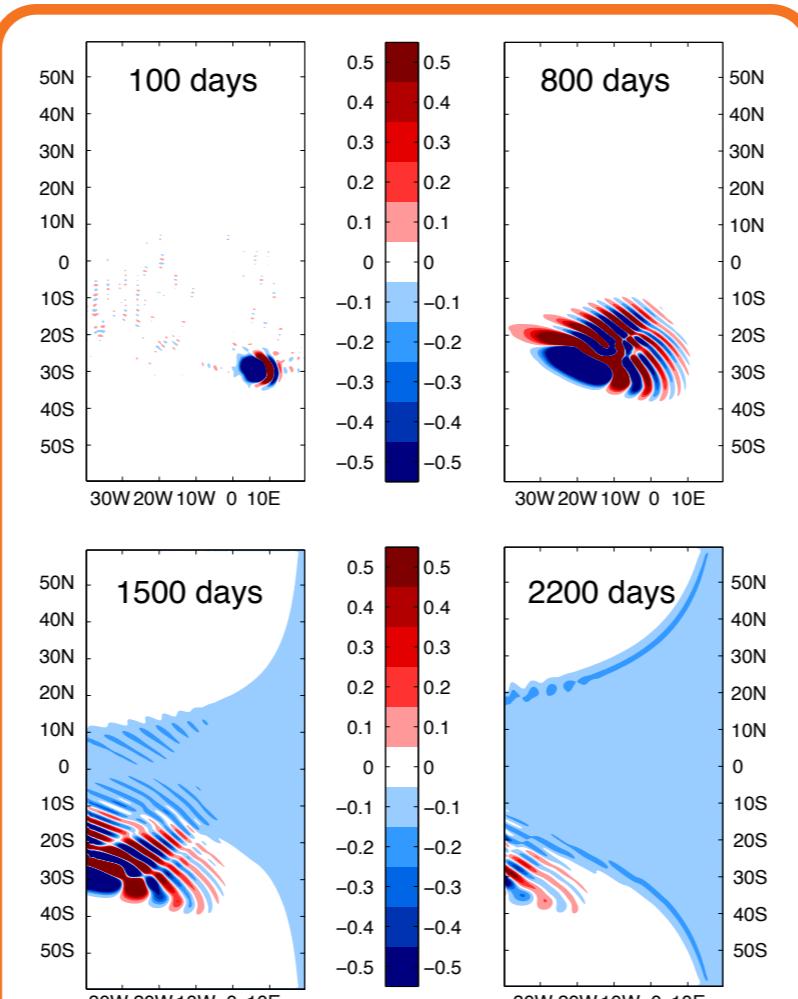
Advection time scales in the Atlantic Ocean



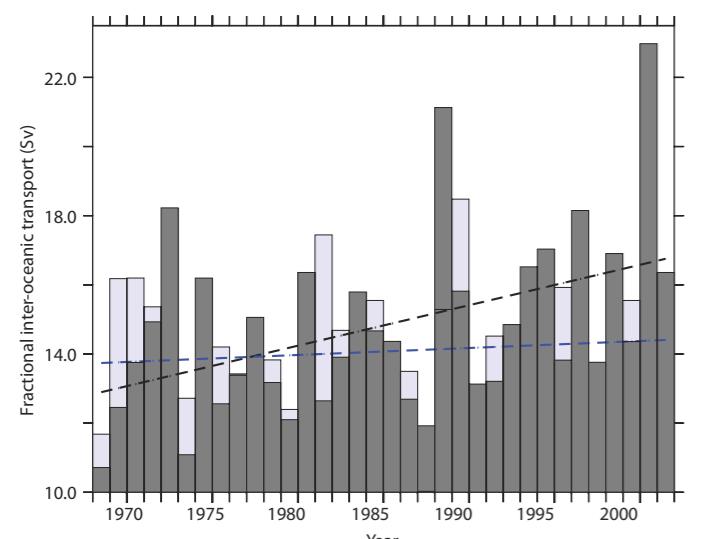
Advection time scales in the Atlantic Ocean



Biastoch et al., 2008, Nature

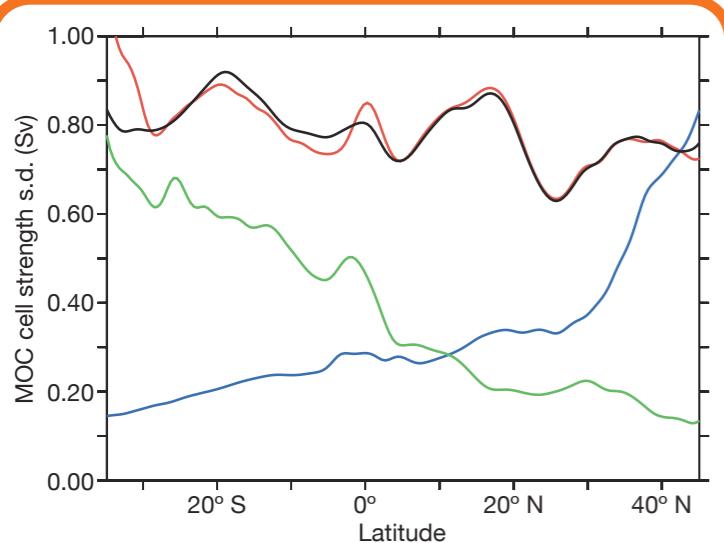


Van Sebille and Van Leeuwen, 2007, JPO

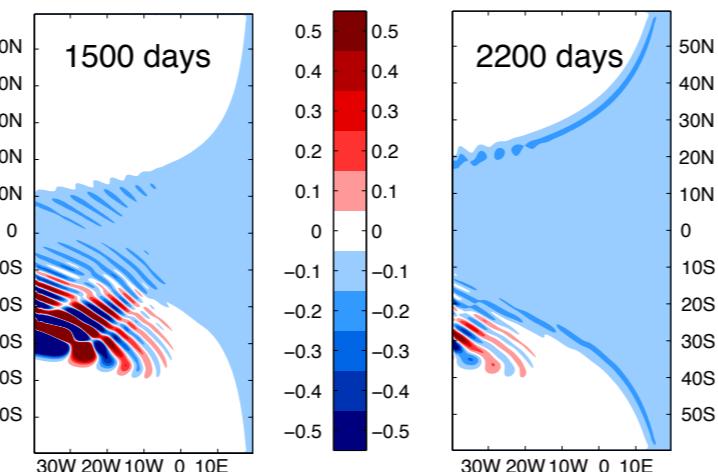
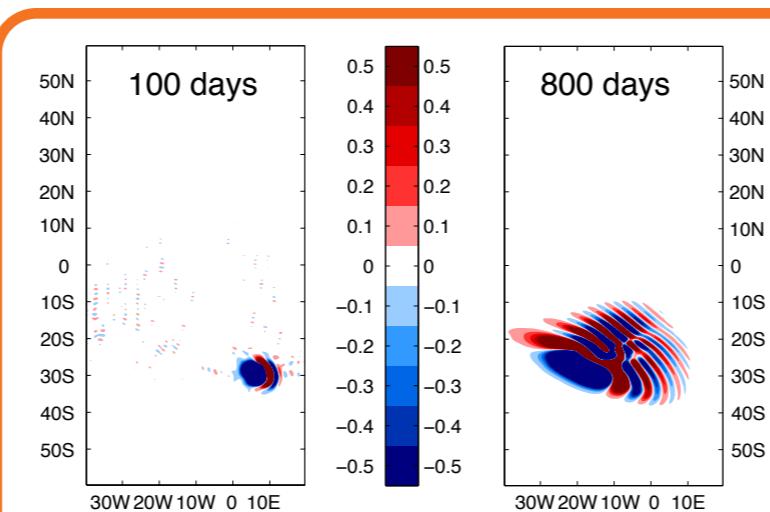


Biastoch et al., 2009, Nature

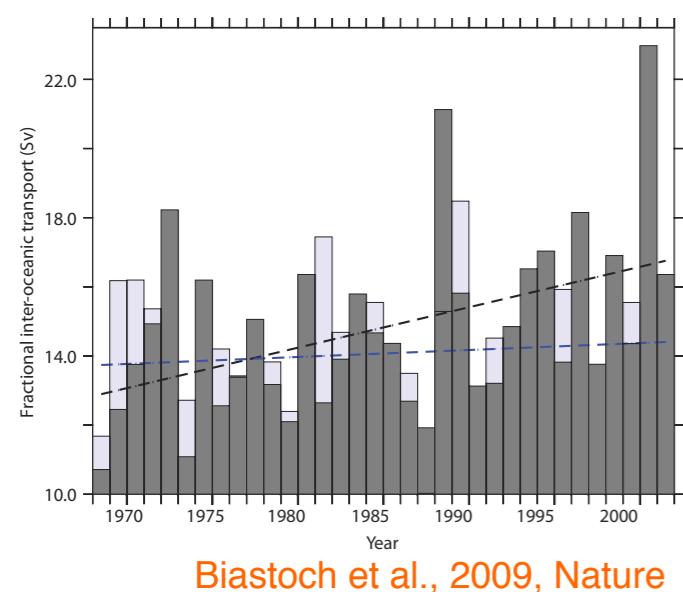
Advection time scales in the Atlantic Ocean



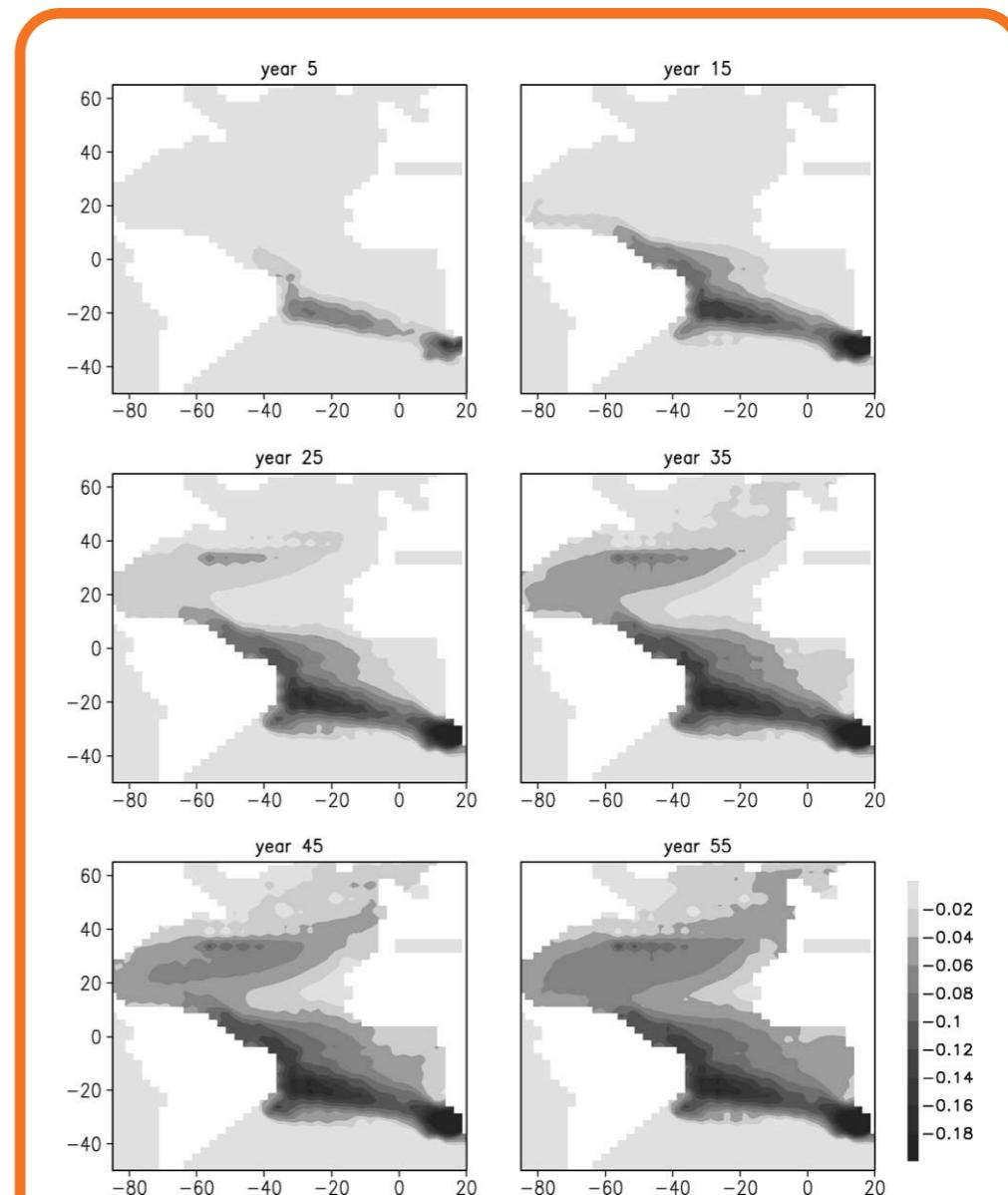
Biastoch et al., 2008, Nature



Van Sebille and Van Leeuwen, 2007, JPO

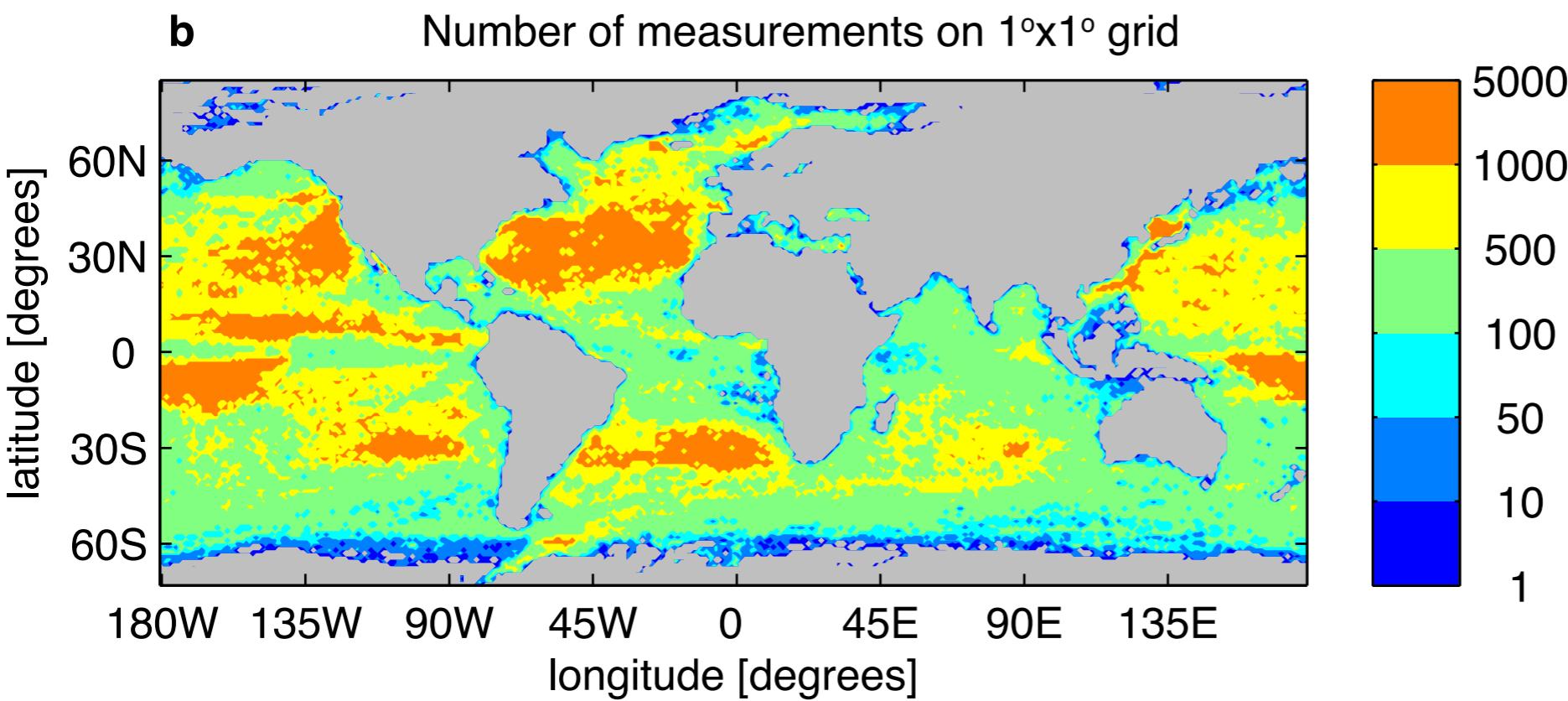
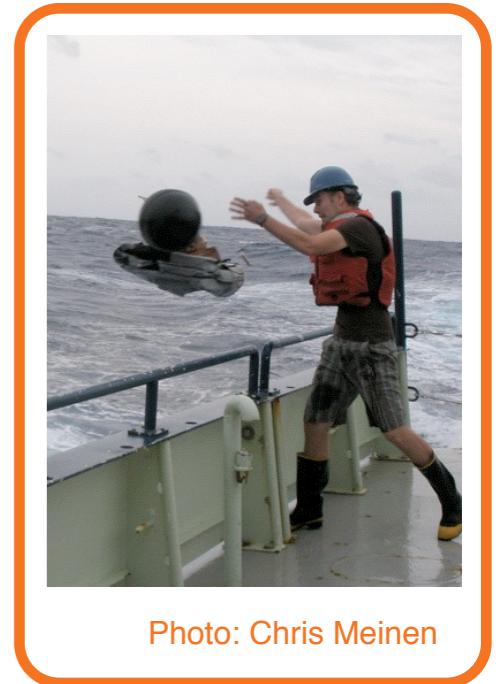
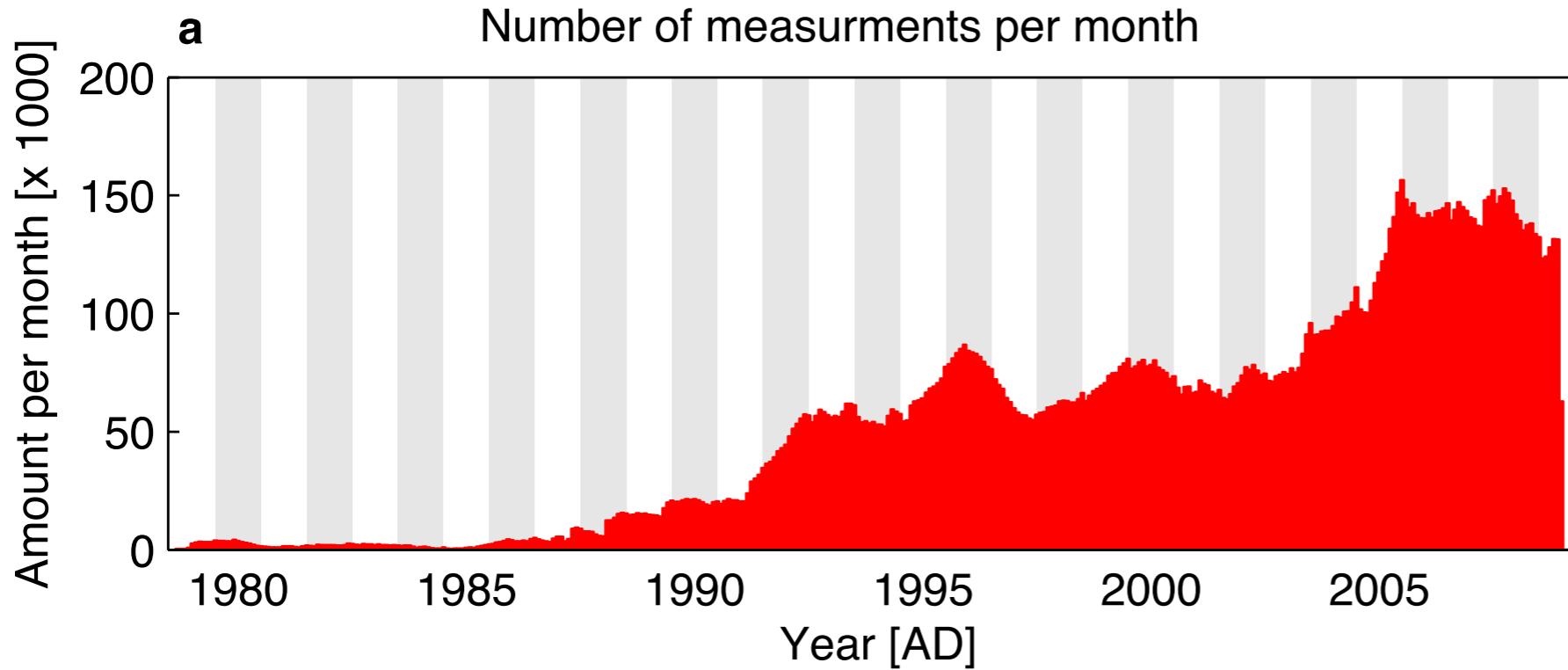


Biastoch et al., 2009, Nature

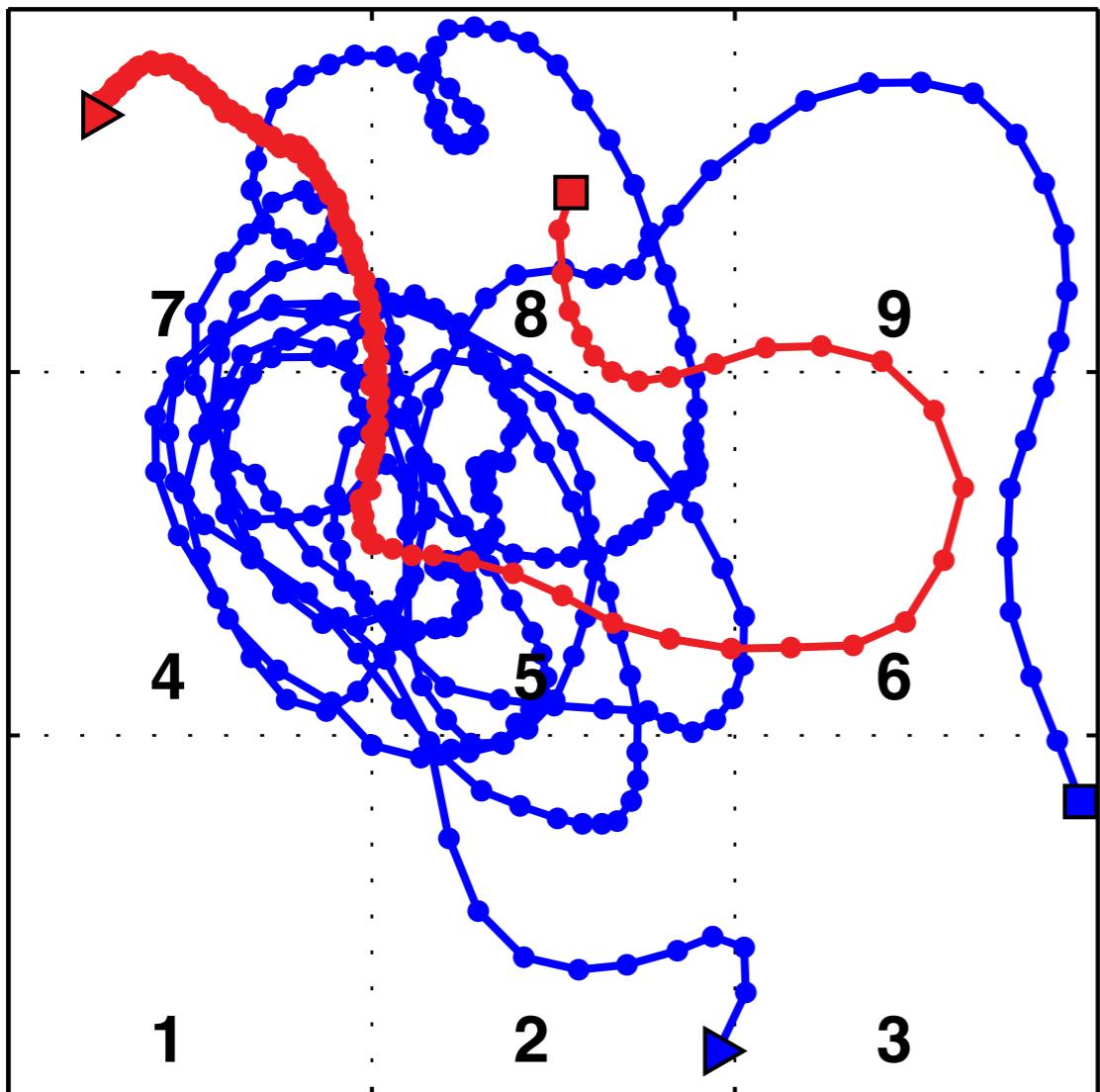


Weijer et al, 2002, JPO

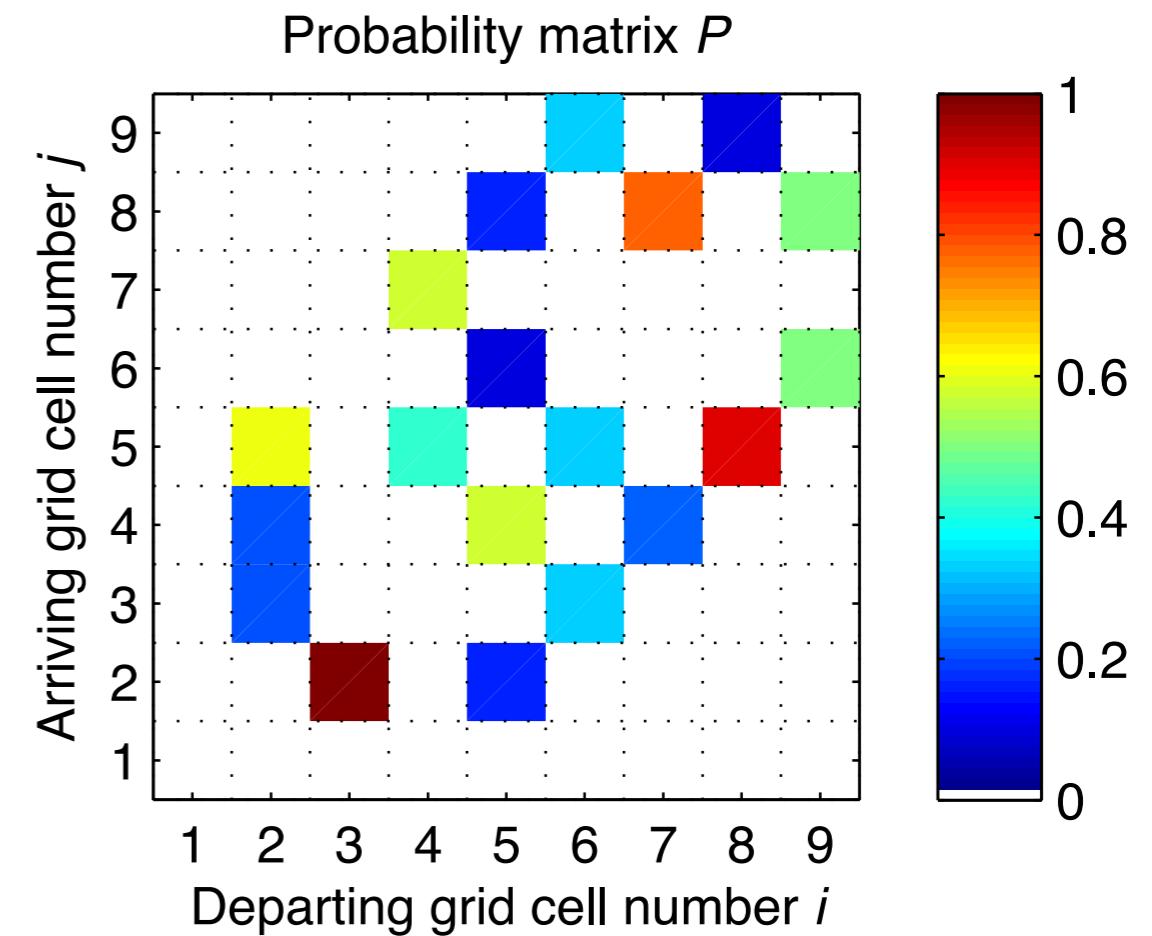
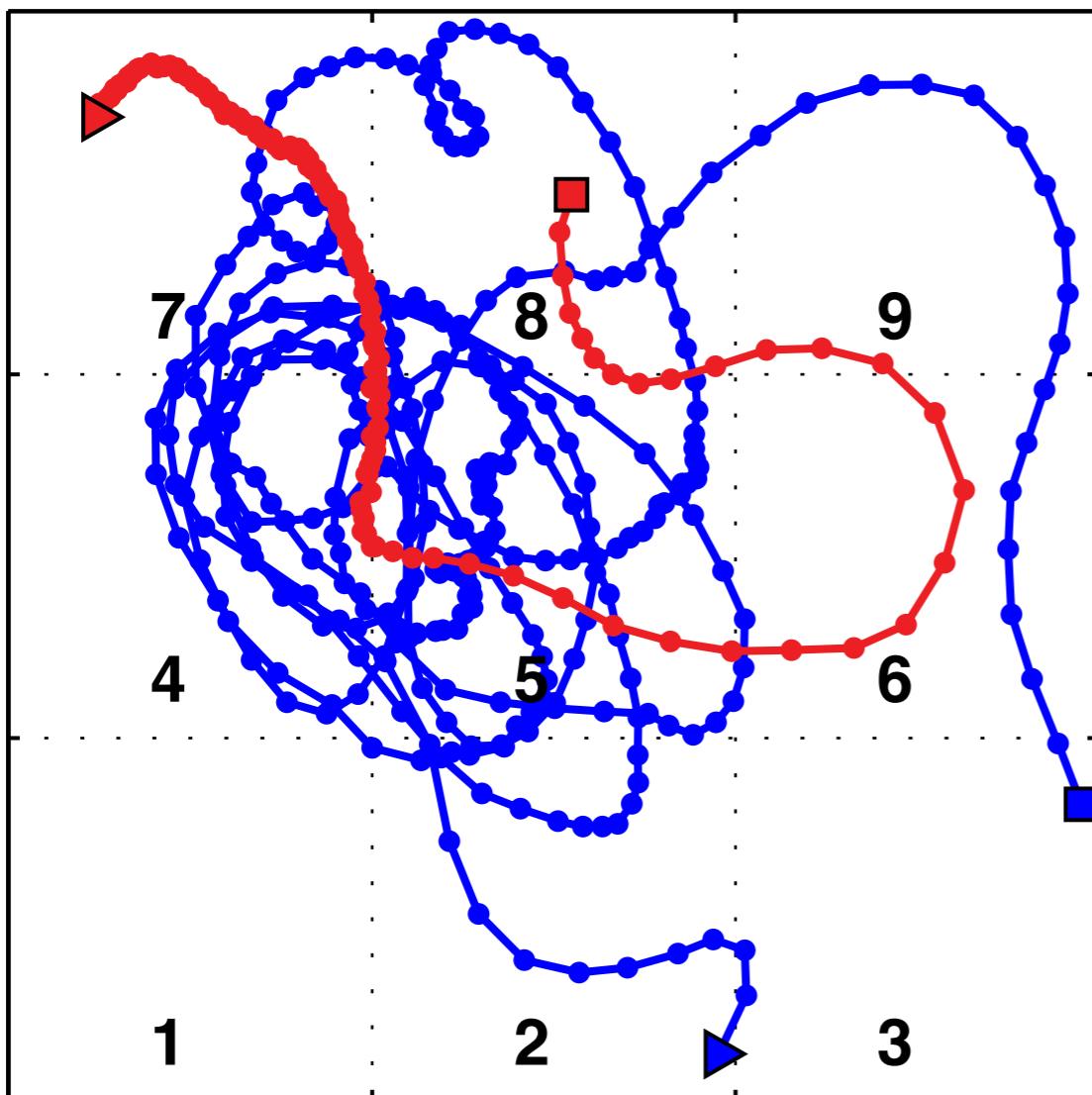
Using observations



Tying trajectories together

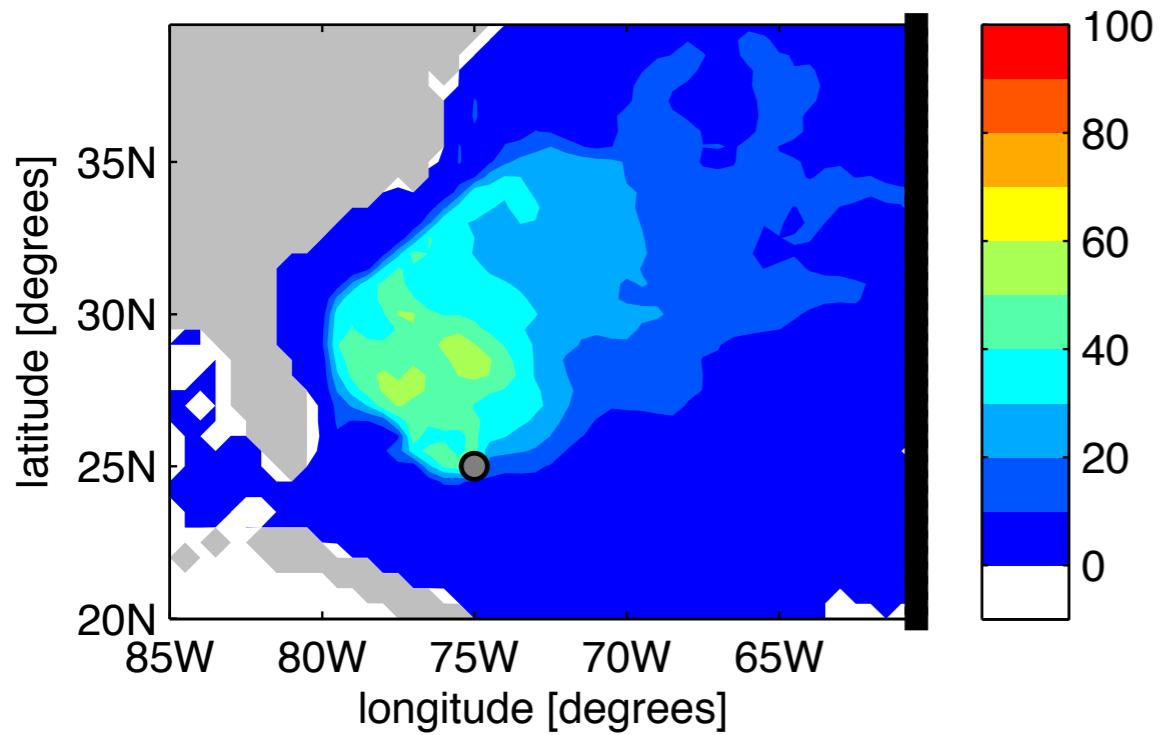


Tying trajectories together

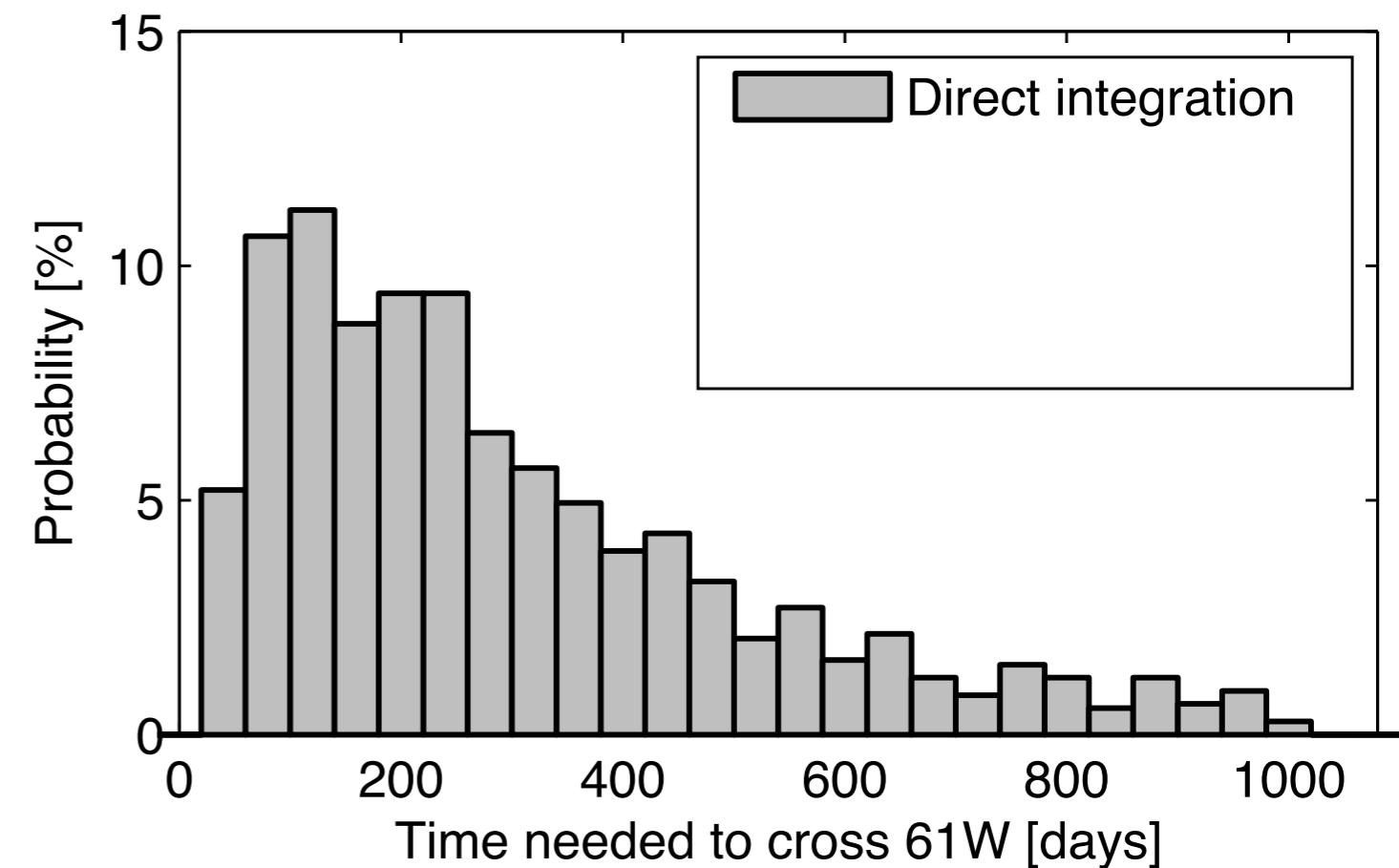
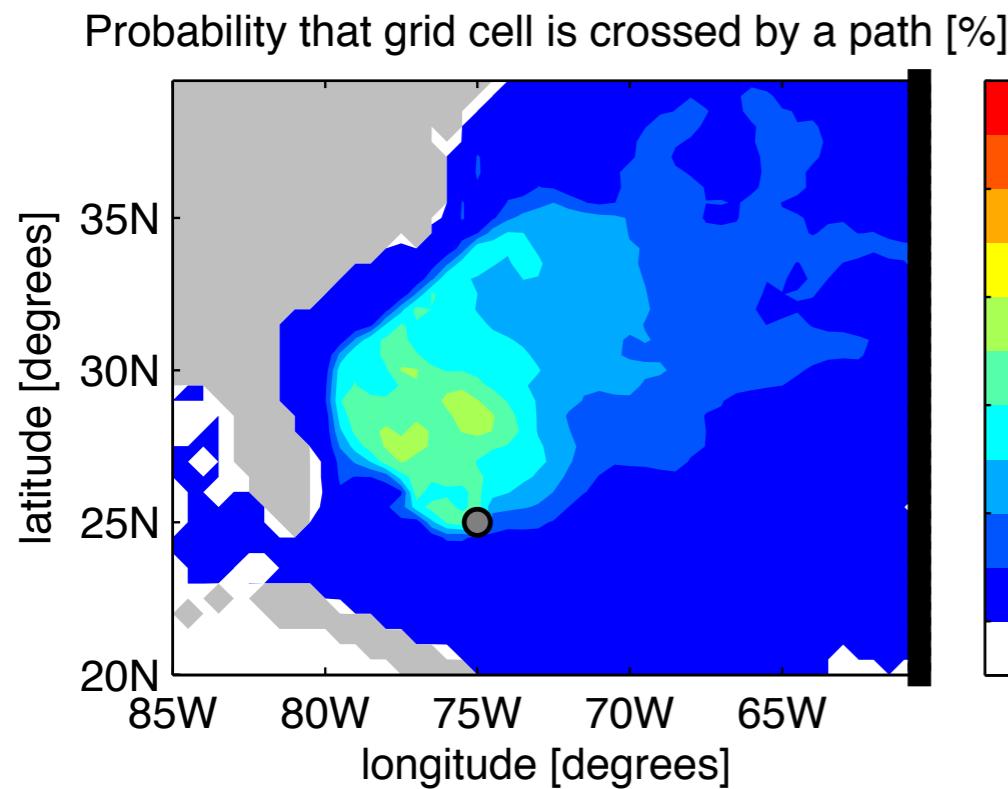


Validating the technique

Probability that grid cell is crossed by a path [%]

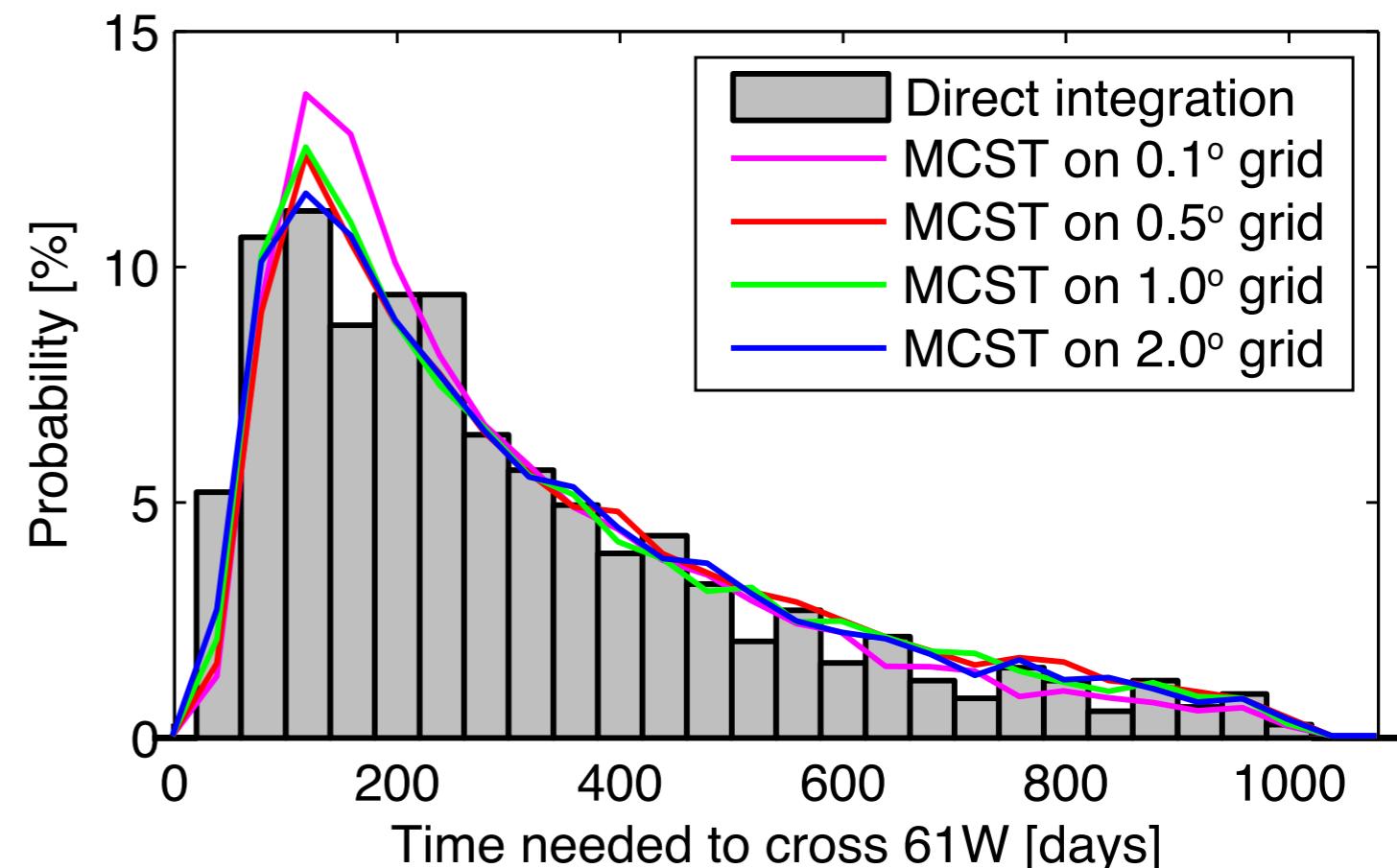
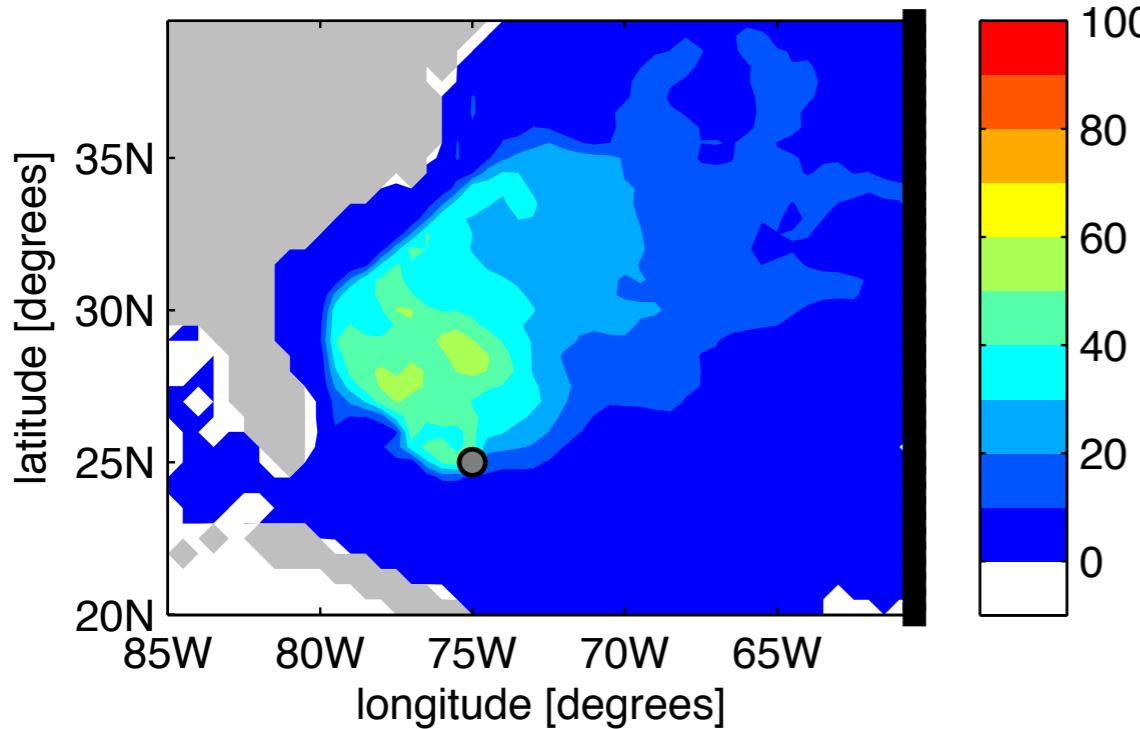


Validating the technique

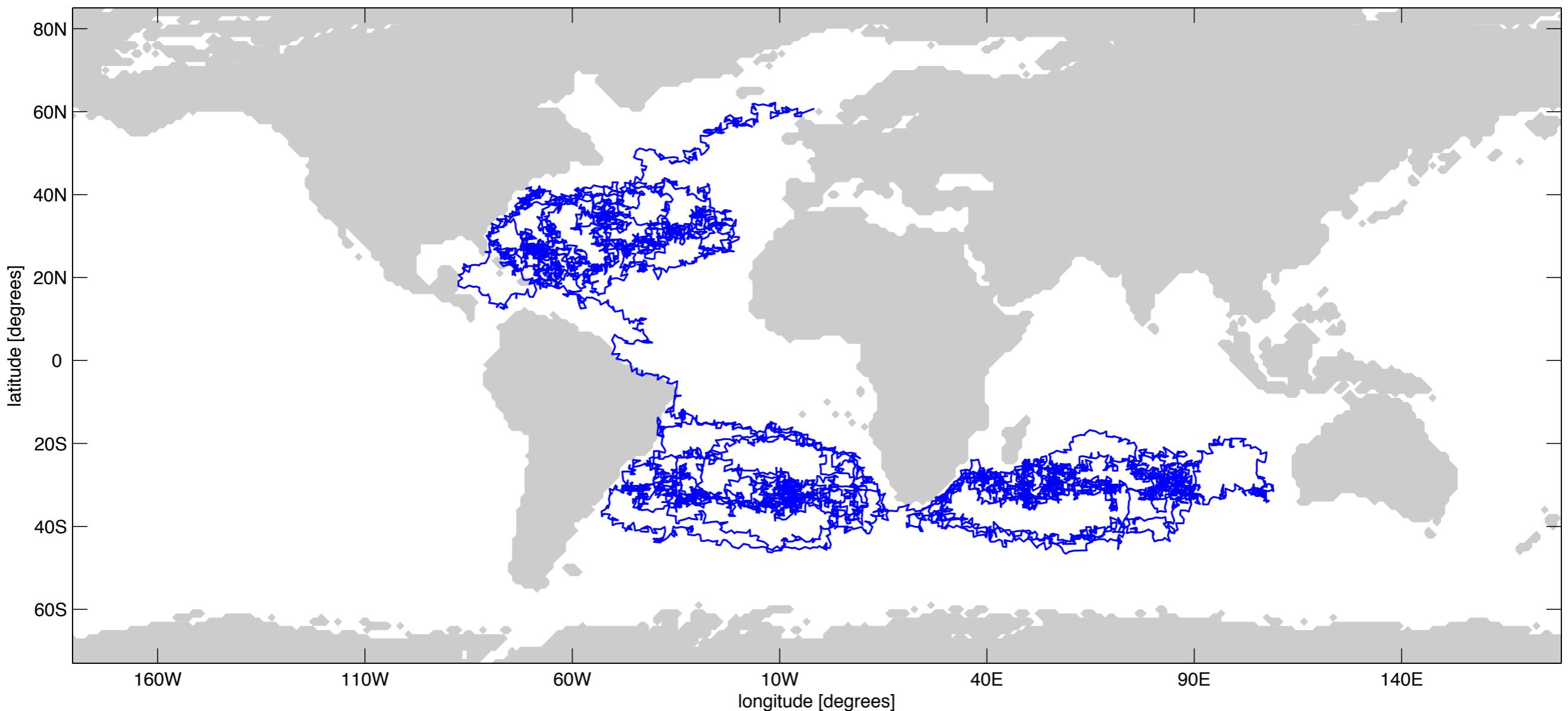


Validating the technique

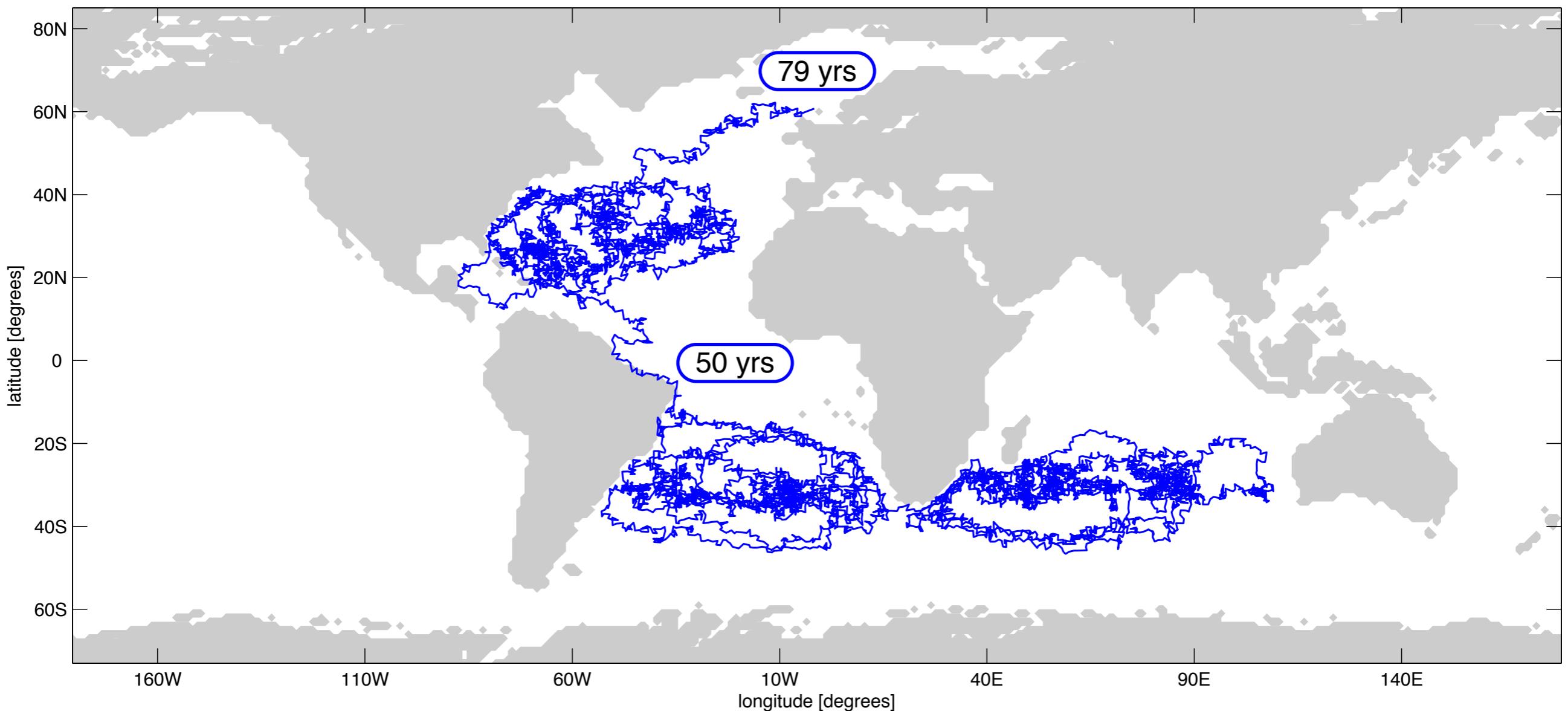
Probability that grid cell is crossed by a path [%]



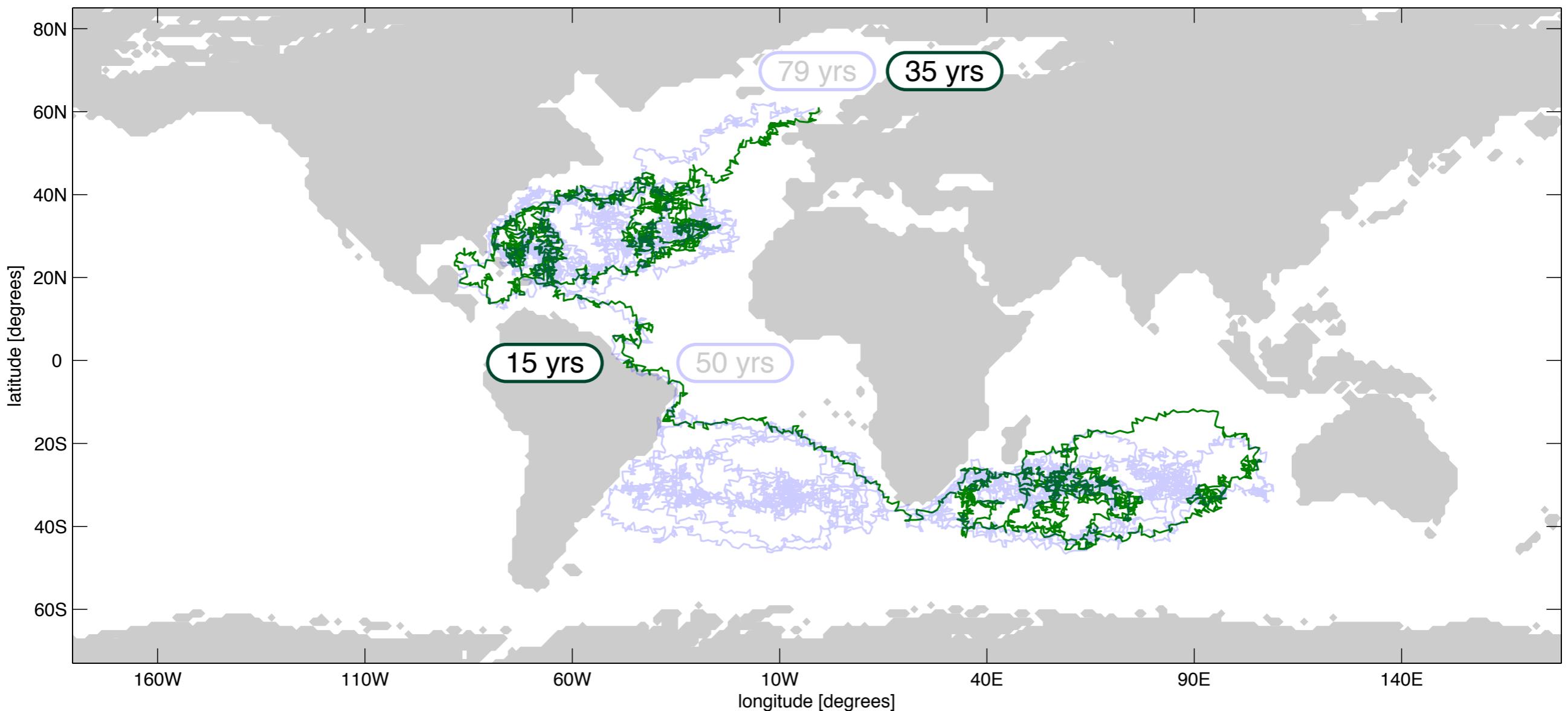
Some examples of surface super-trajectories



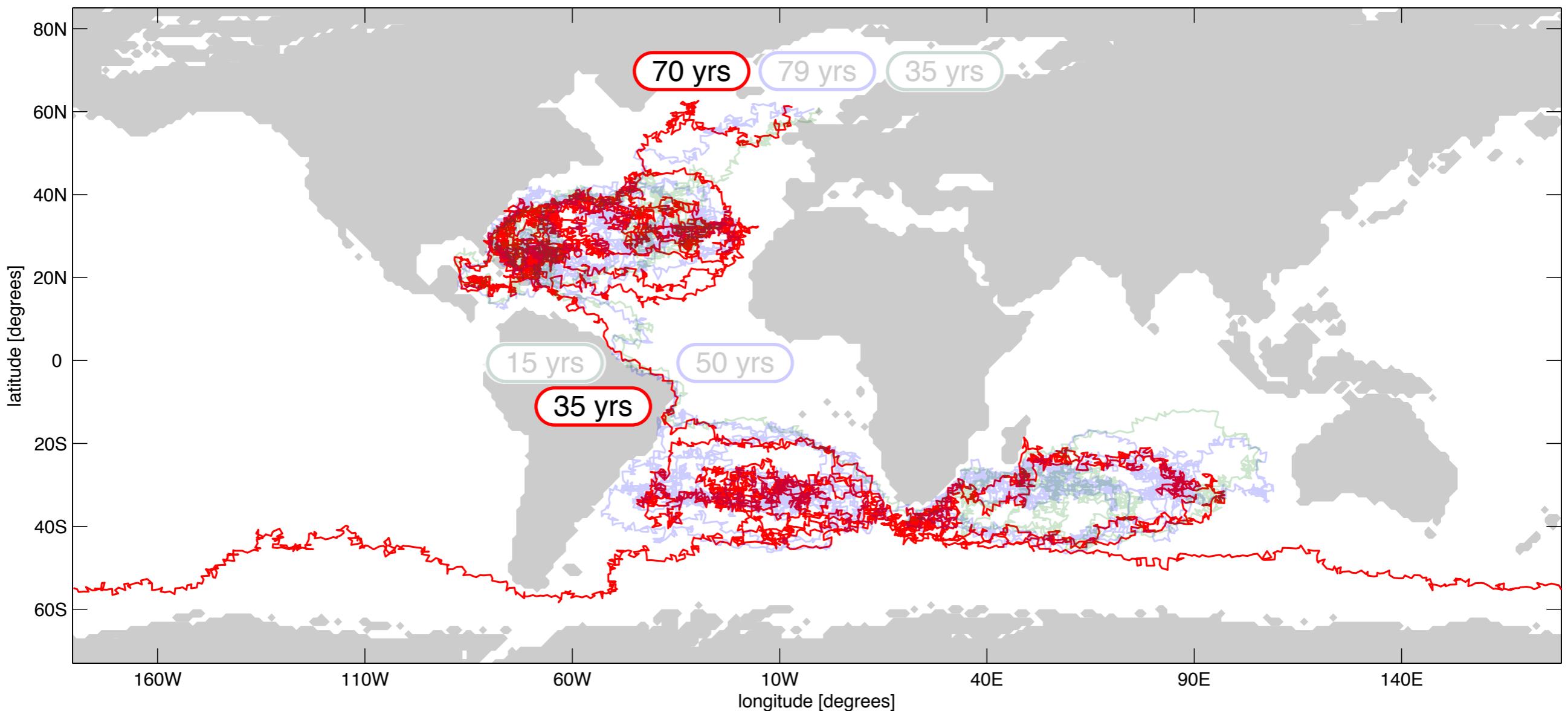
Some examples of surface super-trajectories



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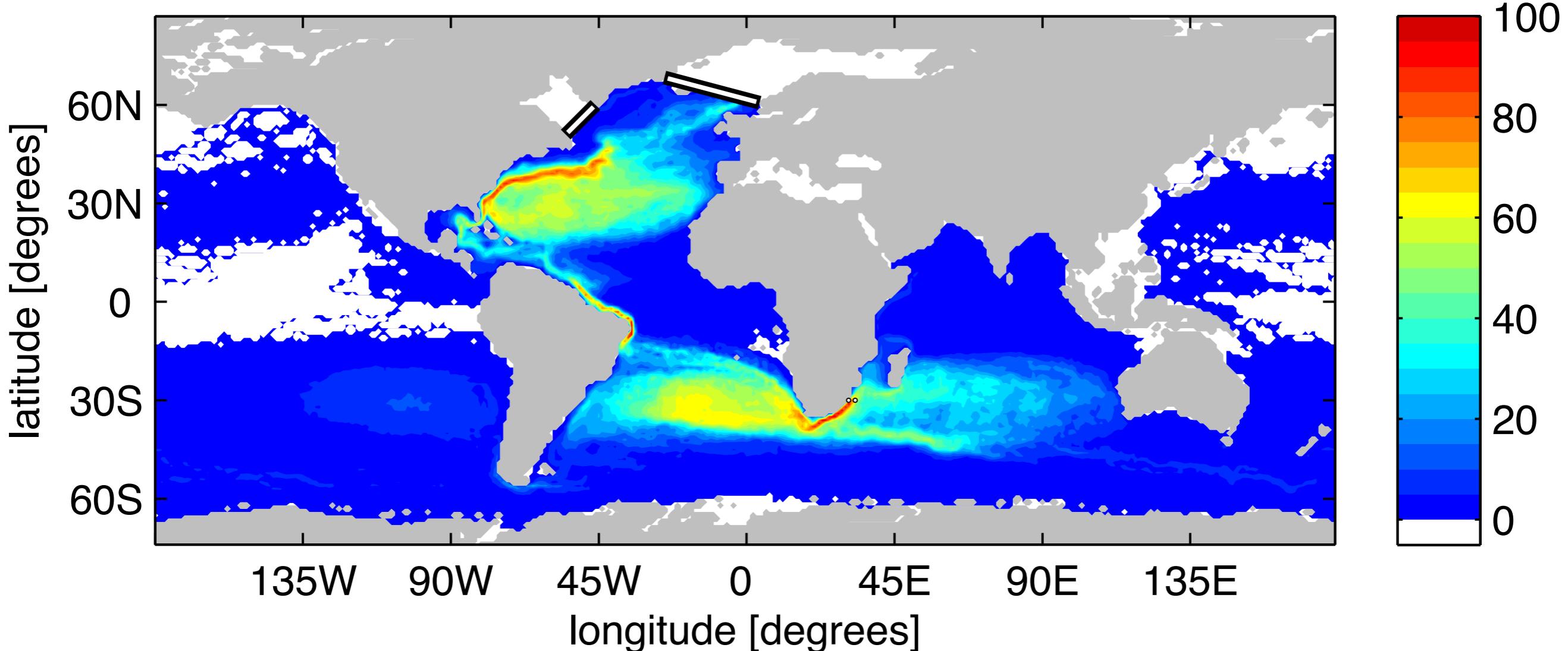


Some examples of surface super-trajectories



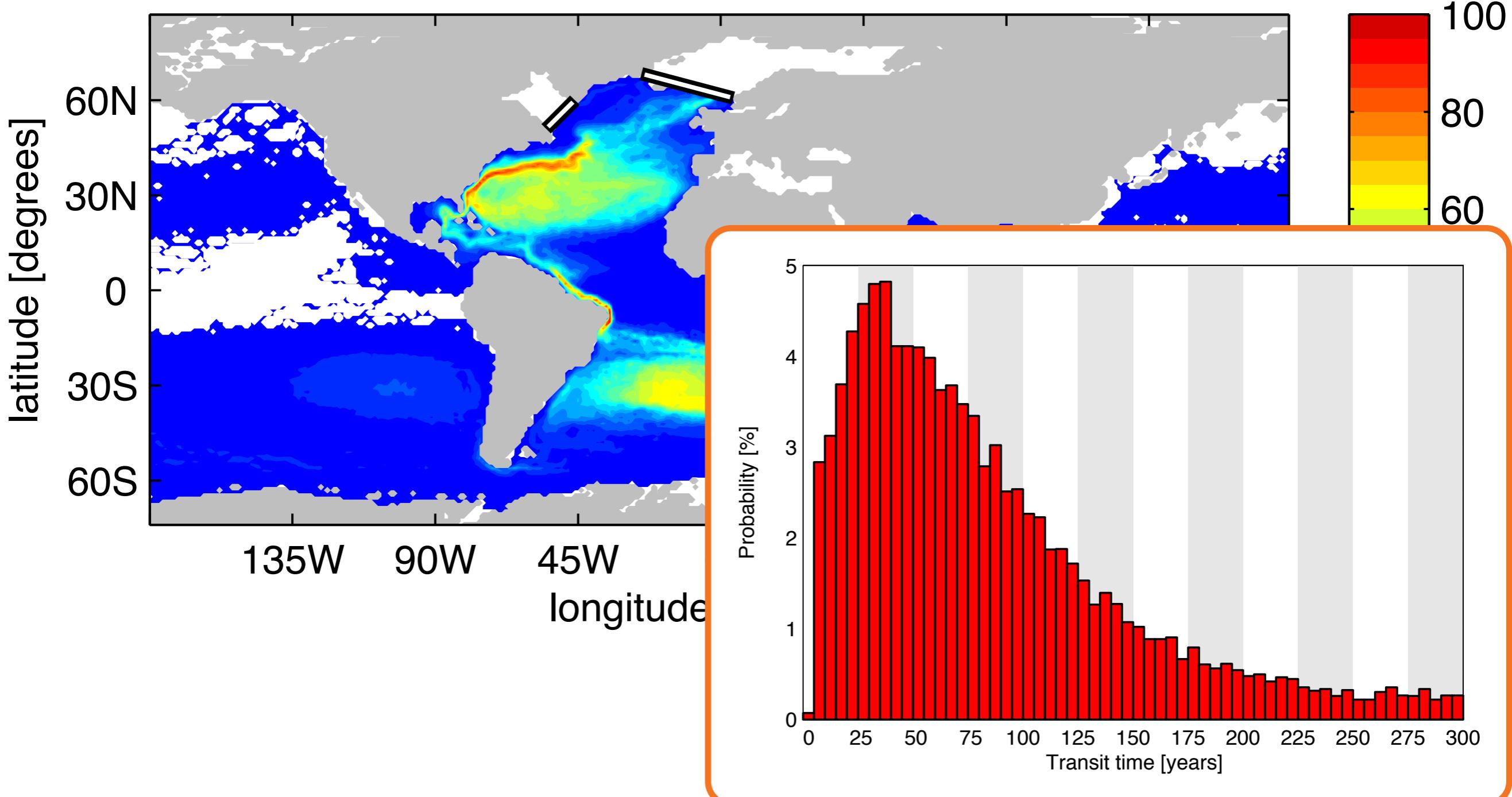
Distribution of surface trajectories

Probability that grid cell is crossed by a path [%]



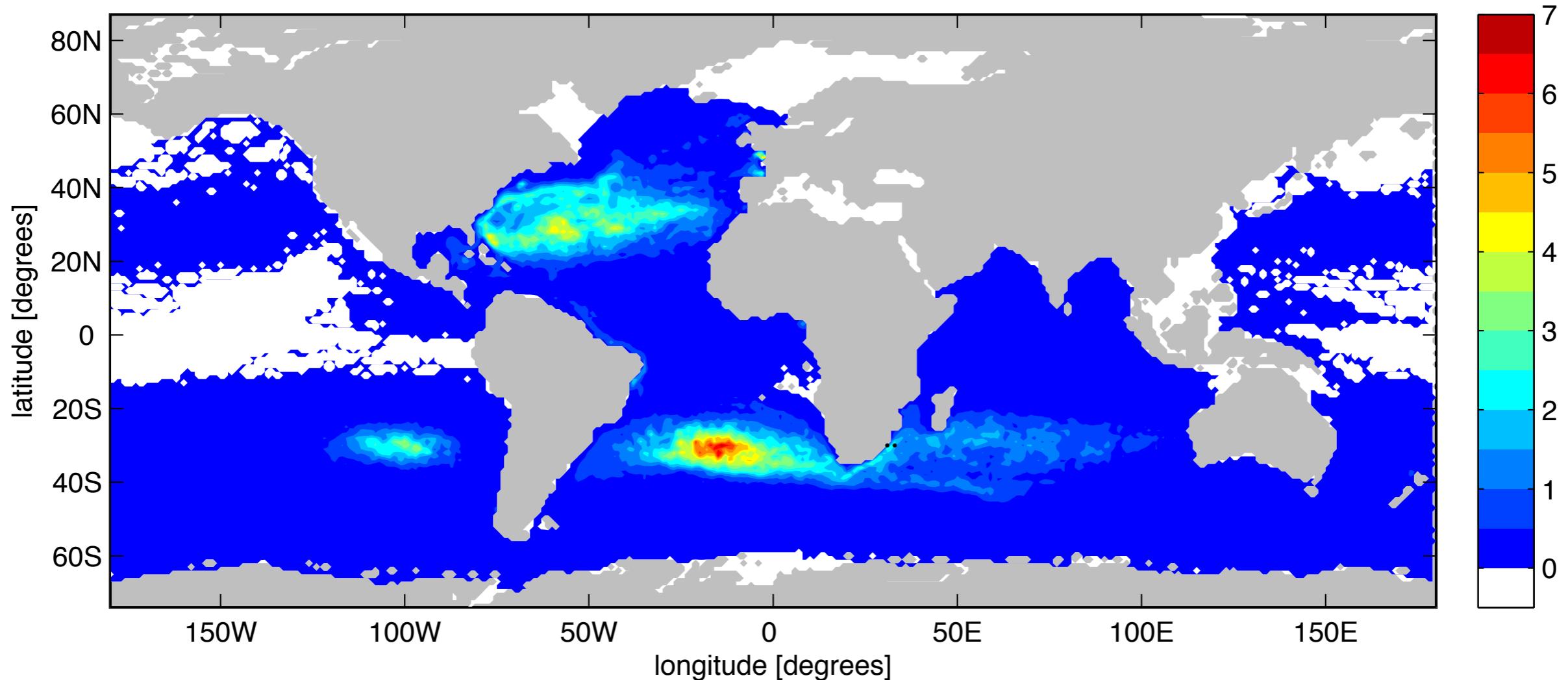
Distribution of surface trajectories

Probability that grid cell is crossed by a path [%]

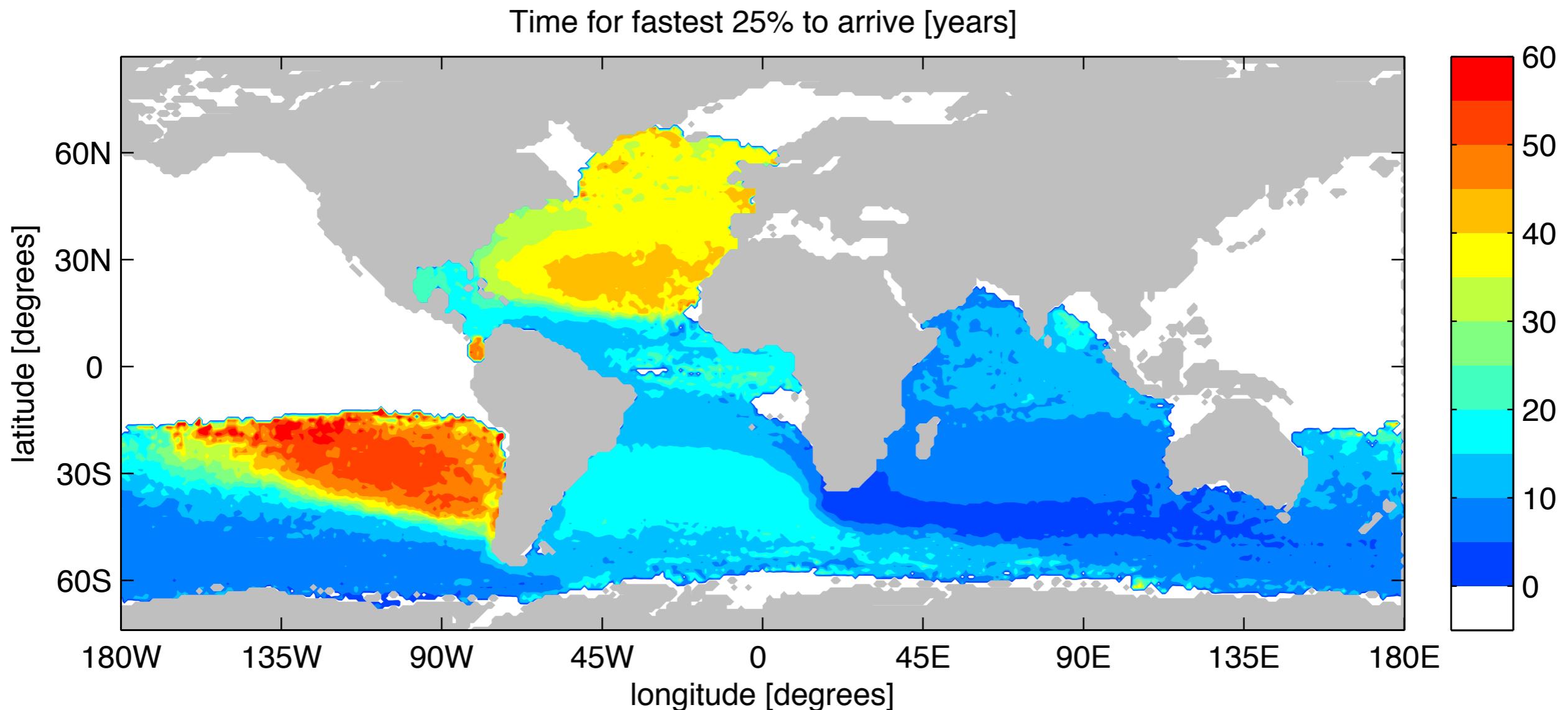


99% do not reach the North Atlantic

Number of crossings per path



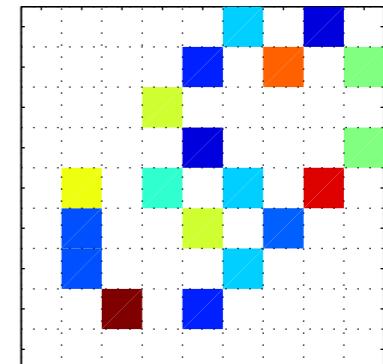
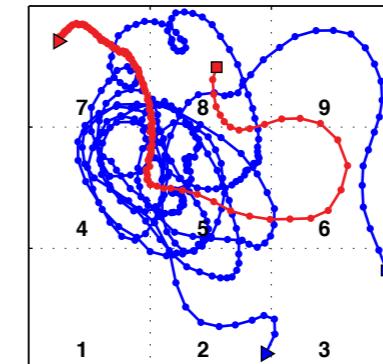
The time needed to cross the Atlantic



Conclusions

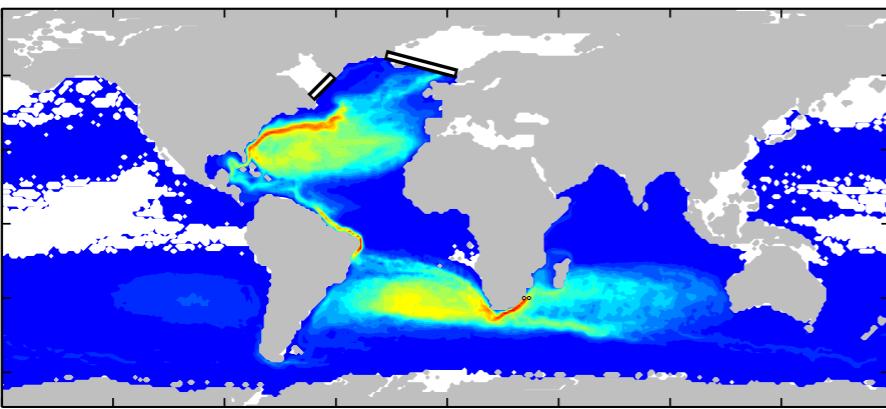
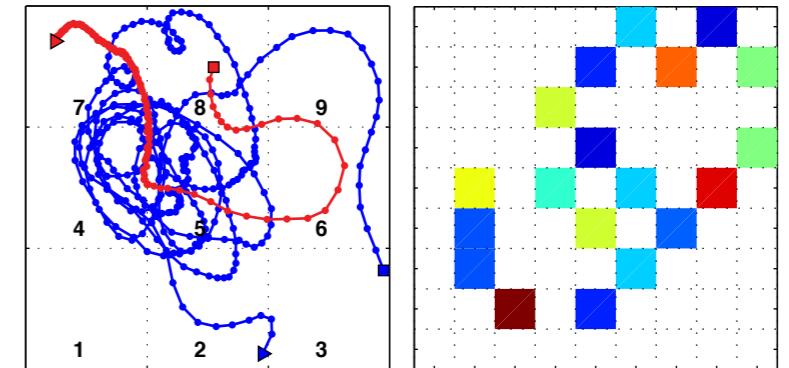
Conclusions

- ▶ Using a Monte Carlo approach, trajectories of infinite length can be computed.
But: only surface circulation for the drifters!



Conclusions

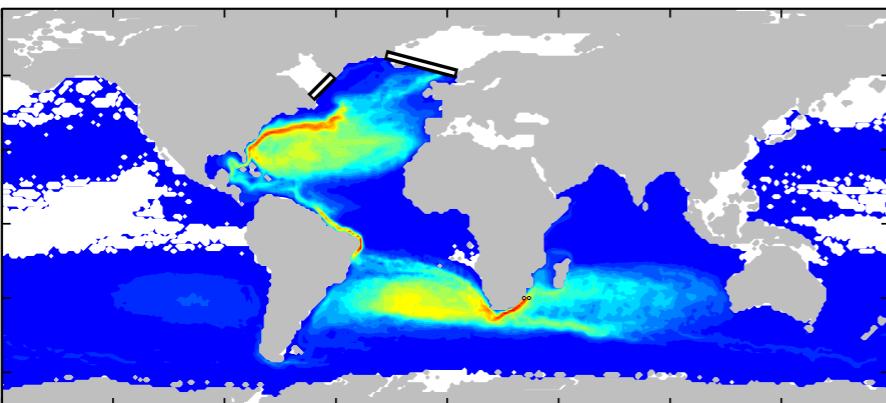
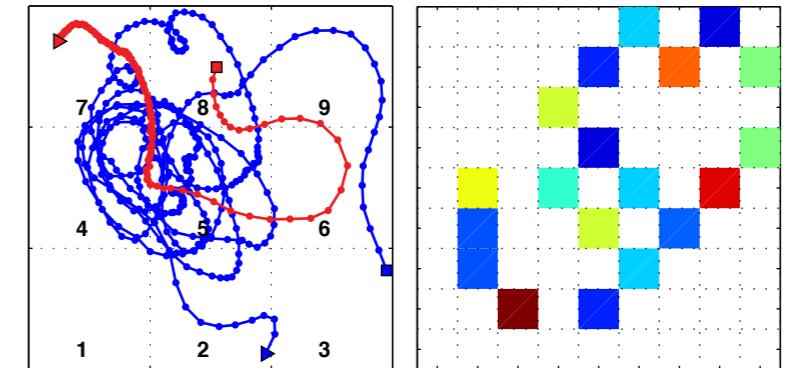
- ▶ Using a Monte Carlo approach, trajectories of infinite length can be computed.
But: only surface circulation for the drifters!



- ▶ The bulk of trajectories reach the North Atlantic within 30 to 40 years

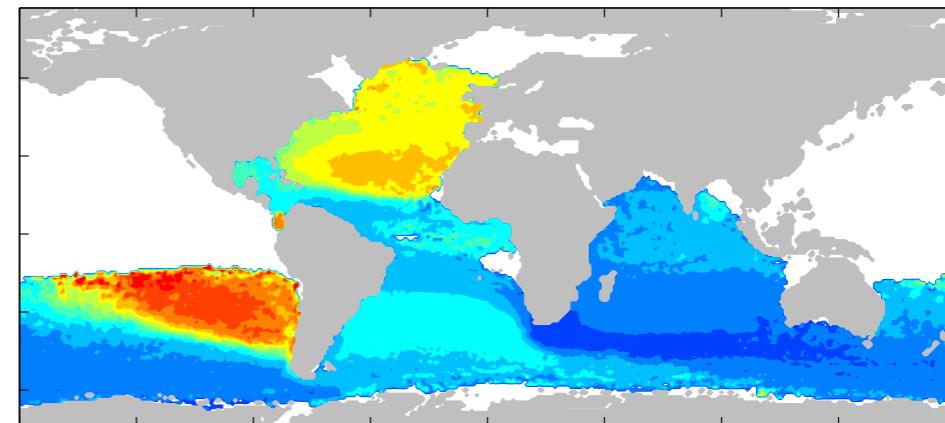
Conclusions

- ▶ Using a Monte Carlo approach, trajectories of infinite length can be computed.
But: only surface circulation for the drifters!



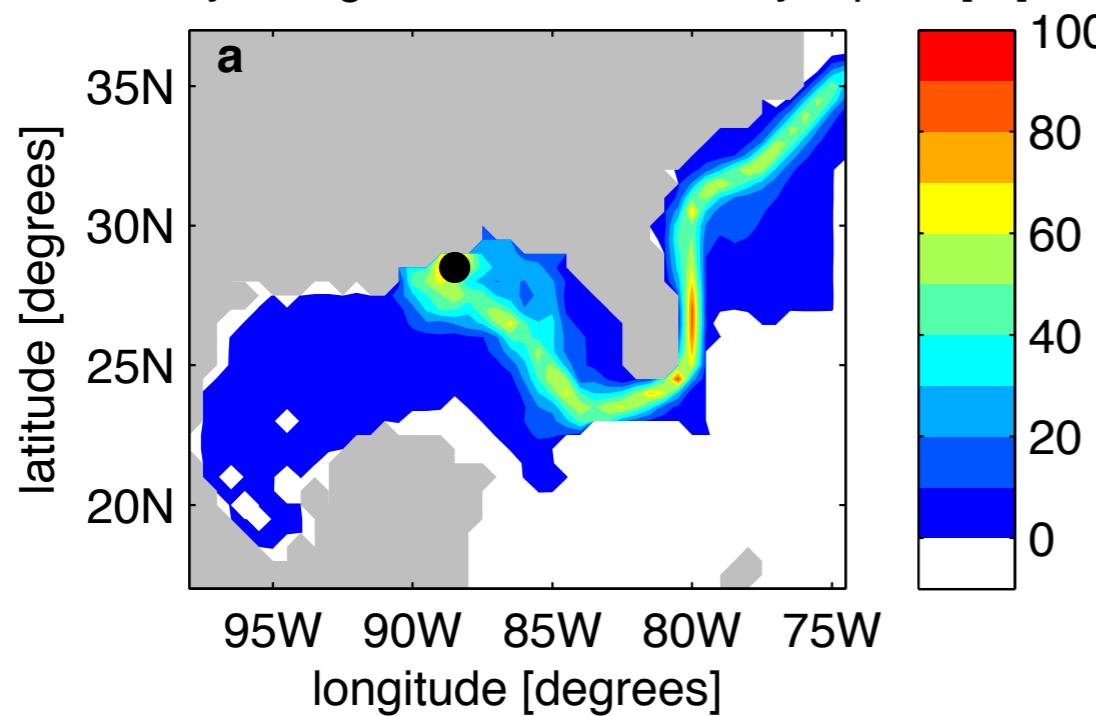
- ▶ The bulk of trajectories reach the North Atlantic within 30 to 40 years

- ▶ Crossing of the South and the North Atlantic takes approximately equal time

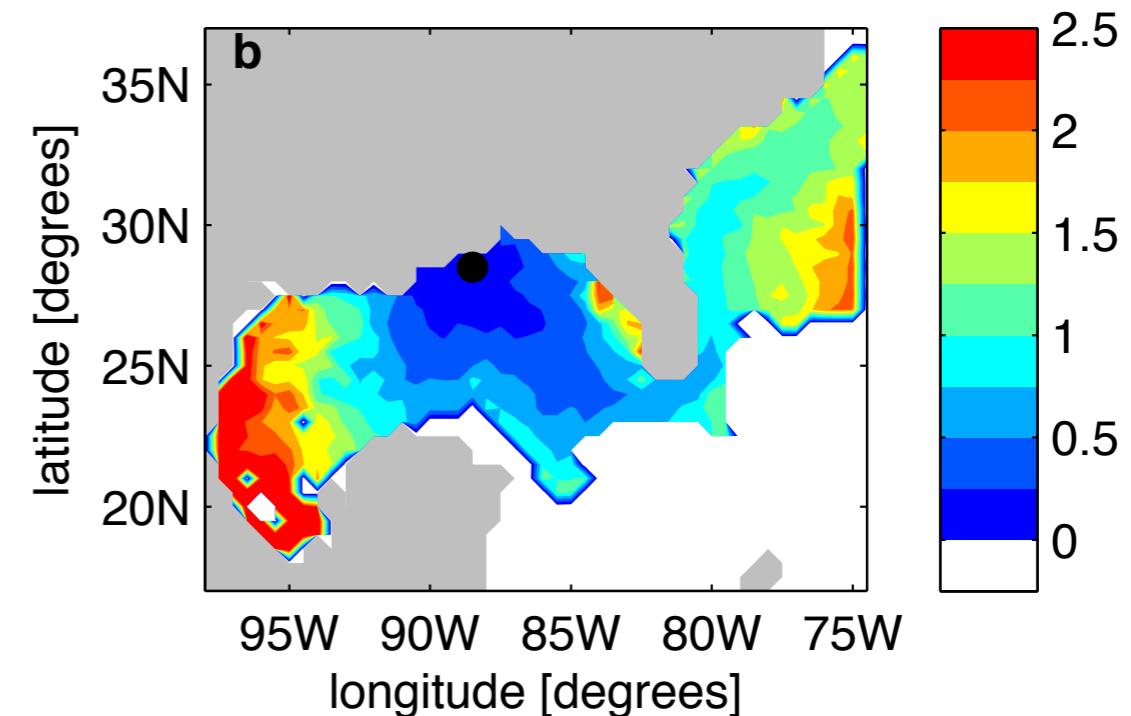


On the oil spill

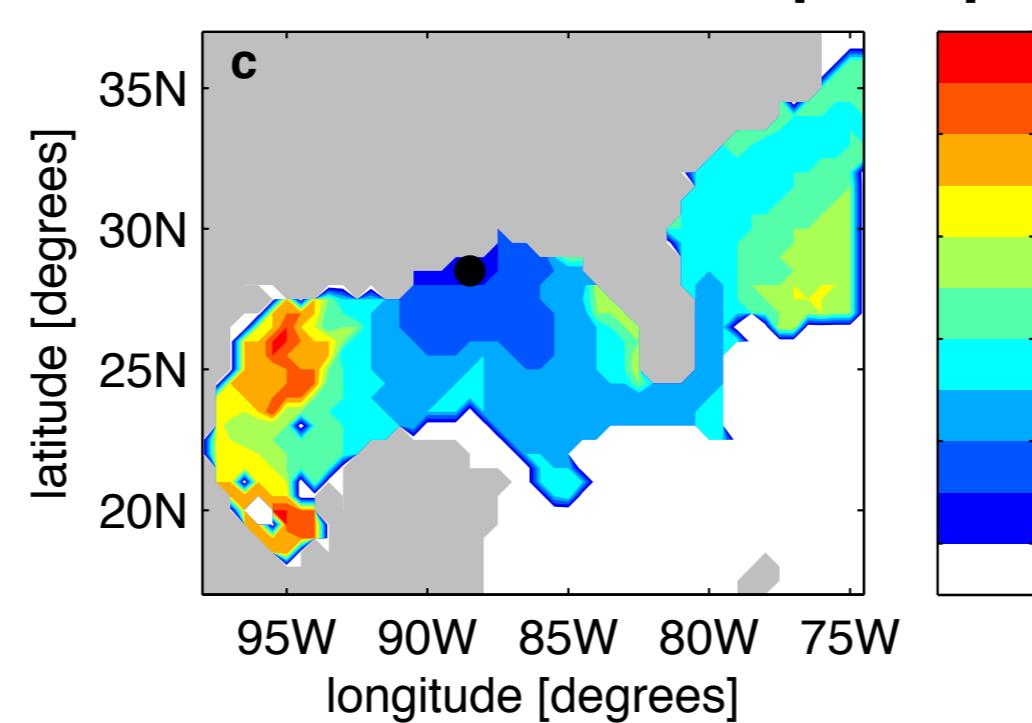
Probability that grid cell is crossed by a path [%]



Earliest arrival [months]



Mode of transit-time distribution [months]



Subduction zones and the garbage patch

