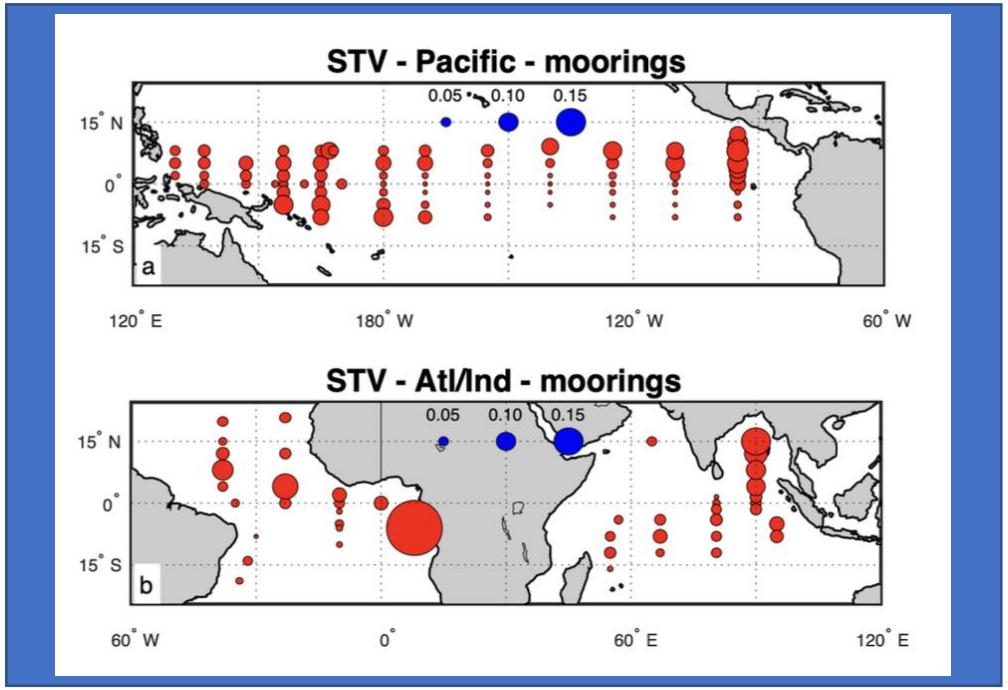
Sea surface salinity short-term variability in the tropics



Short-term variability (STV) of sea surface salinity (SSS). Each red circle is the location of a mooring deployed as part of the global tropical moored buoy array. The size of the circle is proportional to the STV. The STV is the standard deviation of SSS over a short time period, typically 2-17 days, determined from velocity data,. The small circles at the top of each panel is a scale in g/kg. This figure shows where the ocean is more or less variable over this short time period.

Problem: Sea surface salinity (SSS) satellites have a large footprint (40-100 km) due to the way in which they make their measurements. The satellite makes an average over this footprint, but ignores potentially significant variations within it, so called subfootprint variability (SFV). We wish to determine the size of SFV, to help understand the uncertainty in the satellite measurements. However, we cannot do that directly because spatially-distributed measurements do not generally exist at the right scale.

Data and methods: The main dataset we use are SSS records from the global tropical moored buoy array (GTMBA). This is a vast network of 123 moorings deployed across the tropical oceans to study El Niño, some with records as long as 20 years. To tie space and time together, we used a dataset of current speed (the OSCAR data). At each mooring, we found the time required for the ocean to travel 100 km at the ambient current speed. We determined how variable SSS is over this time interval at each mooring location, the short-term variability (STV).

Broader significance or implications: SFV is a significant source of mismatch between satellite and *in situ* data, but has not been quantified on a global basis. The analysis done here with the GTMBA gives us estimates of STV, a proxy measurement for SFV, over a large area of the tropical ocean.

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