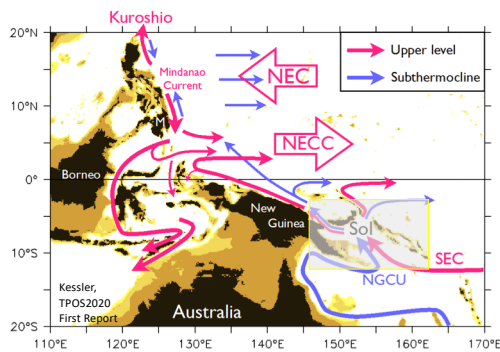


# Observing Low Latitude Western Boundary Currents: A Pilot Study

## Janet Sprintall (SIO) and the TPOS-2020 Western Pacific Task Team



### GOALS of the TPOS-2020 Pilot Study

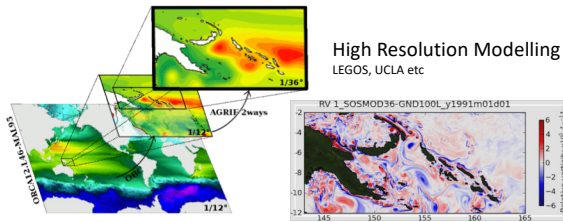
- Determine the **scales of variability** needed for a sampling strategy to **resolve the mass, heat and freshwater transports** within the Low Latitude Western Boundary Currents (LLWBCs).
- multi-platform approach** needed with combination of line-mode transects (XBT; gliders, moorings etc.) and broad-scale (Argo; drifters; remotely-sensed etc.)
- Determine **key observational sites** in the LLWBCs, decide on the **variables to be observed** in terms of priority and readiness of technology, and determine the **time and space scales** that must be resolved in order to develop a sustained boundary observing system
- Build on existing relationships:** The pilot array would explore potential opportunities to collaborate between **international institutions** for the implementation and maintenance of TPOS, to determine ways to **share costs** such as through ship time, instrument input and logistical capabilities.
- ITF, SPICE and NPOCE programs provide starting point to a coordinated pilot array and a sustained system.

## The SOLOMON SEA: A Case Study for Assessing a LLWBC Observing System?

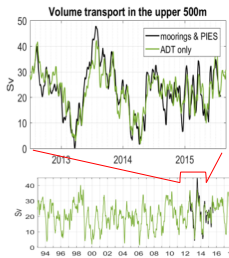
- The New Guinea Coastal Current System, the LLWBC of the South Pacific, transits the Solomon Sea on way to the equator
- complicated narrow pathways that bifurcate
- Intense and deep reaching flows encounter complex and steep topography
- High mixing induces water mass transformation
- Enrichment of water masses (land-sea exchanges) mean significant micro-nutrient input
- Three narrow exit passages: Vitiaz, St Georges and Solomon St.
- Each exit pathway has different transit time to equator and carries different water masses and different biogeochemical properties
- The South Pacific Circulation Experiment (SPICE) program focused a number of different observational programs in the Solomon Sea



Exit Passage Mooring Array  
Sprintall, Ganachaud, Cravatte, Alberty, Germeau

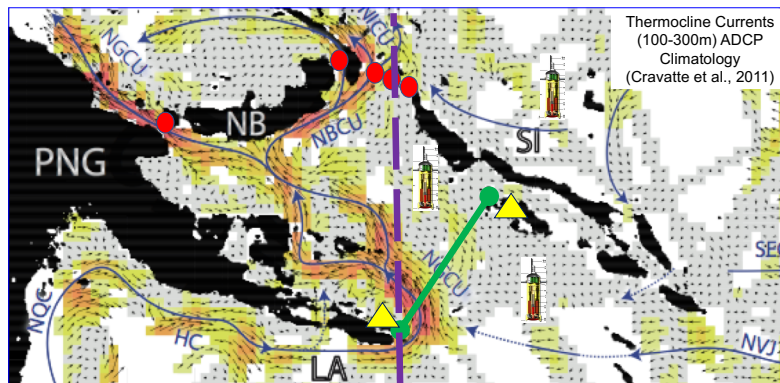
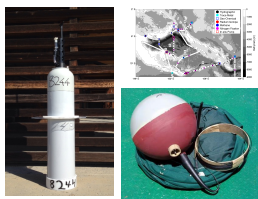


High Resolution Modelling  
LEGOS, UCLA etc



Remotely Sensed  
Develop proxy transport estimates

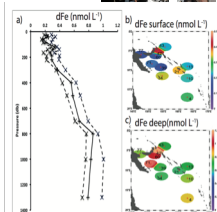
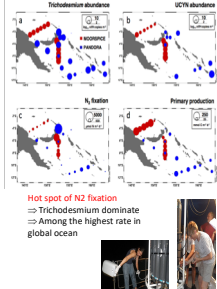
### Global Observing System



Thermocline Currents (100-300m) ADCP  
Climatology (Cravatte et al., 2011)

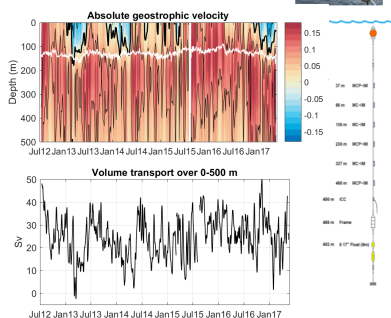
### Biogeochemistry Surveys

Jeandel, Bonnet, Van Beek,



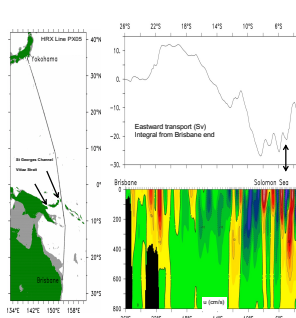
### Dynamic Height and PIES moorings

Send, Anutaliya, Lankhorst



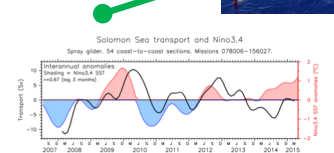
### Repeat High Resolution XBT Transects

SIO HRX Group



### Repeat Glider Transects

Kessler, Davis



### An International Ocean Obs 19 Effort:

An OO19 white paper will review all these complementary approaches in the Solomon Sea, as well as discuss the requirements and strategies for observing the transports, properties and the micro-nutrient input variability. Integration across networks is key to meet the challenges posed by the complex western boundary regions and to define a regional sustained observing system for the LLWBCs for the next decade. At present this is a primary missing element of the global ocean observing system.