EGU21-13806
https://doi.org/10.5194/egusphere-egu21-13806
EGU General Assembly 2021

Variability and meandering of the East Australian Current jet at 27°S

Bernadette Sloyan, Christopher Chapman, Rebecca Cowley, and Thomas Moore
CSIRO, Oceans and Atmosphere, Hobart, Australia (bernadette.sloyan@csiro.au)

The East Australian Current (EAC) is the complex and highly energetic western boundary current of the South Pacific Ocean gyre. Low frequency (>2 year) variability of the EAC reflects the changes in the wind and buoyancy forcing over the South Pacific. However, local and regional wind and buoyancy forcing drives higher frequency variability (< 1-2 year) of the EAC. Due to the narrow shelf, the EAC-jet meandering has an immediate impact on the continental shelf circulation. Here we use the IMOS EAC mooring array between May 2015 to September 2019 and satellite observational data to quantify the quantify the EAC variability and assess the potential drives and impact of the on-shelf meandering of the EAC jet on the properties of the Coral and Tasman Seas.

We find that there is considerable variability of Sea Surface Height (SSH) and Sea Surface temperature (SST) that at times co-vary, but at other times the anomalies are opposed. We compare the surface anomalies with the EAC velocity and transport timeseries. The mean along-slope velocity vectors show poleward velocity dominates from 0-1500 m at the five mooring locations from the 500 m isobath to the deep abyssal basin with the strongest southward flow at the continental shelf. The variance ellipses show that the largest variability in EAC transport is in the along-shore direction. This indicates that the EAC variability is dominated by the movement of the EAC on- and off-shore. The EAC thus maintains its jet structure as it meanders onshore and offshore adjacent to the continental slope. While the mean along-shore velocity vectors provide a picture of the mean EAC, the time-series shows that the EAC has a complex and highly variable structure. Strong southward flow is associated with off-shore flow (positive across-slope velocity). While mostly measuring the EAC core we see times where the flow is northward (positive along-slope velocity). This northward velocity is due to the shelf flow extending from the coast to the shelf, and is generally associated with on-shore flow (negative across-slope velocity). These changes in the direction and strength of the velocity are driven by cyclonic eddies inshore of the jet, and have significant influence on the exchange between the open and shelf ocean.