

## **Dissolved iron distribution and budget in the Solomon Sea**

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As part of the PANDORA cruise (GEOTRACES GP12), concentrations of dissolved iron (dFe) were measured at 11 stations inside and outside the Solomon Sea (SolSea), a semi-enclosed sea in the western tropical Pacific, with complex topography and straits, and strong western boundary currents supplying the equatorial current system. These measurements aimed to better assess the various sources of dFe in our study area and the Solomon Sea's potential as a source of dFe for the Equatorial Undercurrent (EUC). A simple box model allows calculating and discussing the fate of the dFe in the different water layers flowing through the SolSea and suggests that the amount of dFe enrichment within the enclosed sea was not significant for the lower thermocline and intermediate waters, indicating that most of the dFe was acquired prior to reaching the SolSea at the entrance and/or that inputs are approximately balanced by scavenging within the basin for these two layers. On the contrary, it was significant for the upper thermocline layer and the deep waters, highlighting enrichments from external sources, as well as combination of internal processes, such as redox processes, scavenging and/or organic complexation. The relative dFe contribution of the Solomon Sea to EUC was 20%, on average. Other sources might thus provide dFe to the EUC, along the water transport downstream of the SolSea (e.g. Bismarck Sea) or from the northern hemisphere. Diazotrophs such as *Trichodesmium* might also contribute to the dFe enrichment of the EUC after export and remineralization at depth outside the SolSea.