

**FINAL REPORT PROGRAM LEFE**

Program LEFE/ GMMC	Project Title <b>ARGO in Indonesia</b>	Years 2015 – 2020
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PI name, email and lab: Ariane Koch-Larrouy Ariane.koch-Larrouy@legos.obs-mip.fr Participating Laboratories : LEGOS	Contribution to <i>INDOMIX, CLIVAR ITF TT</i> Other funding sources : Indonesian
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*Context:* Indonesian seas are the place of intense water mass transformation in a critical region of tropical climate. It is thus crucial to better understand ocean physics in those seas and to represent it correctly in models. However, there is a lack of in-situ data and almost no ARGO float in this region (figure 1). The floats of the Pacific Ocean that may enter the Indonesian seas, are blocked by a complex topography. Also ARGO floats are not deployed in Indonesia seas until now due mainly to political reasons.

*Objectives / scientific questions:* The objective of this project was to deploy the first two ARGO floats in the interior seas, based on solid collaboration between France and Indonesia.

*Main results:* The first Argo was deployed in 29 July 2017 (131E, 5S) and the second in August 2018 in the Banda Sea. They provide unique data in the eastern part of Banda where no data have been acquired until now and show the penetration of the NPIW. Signature of fine-scale structure is also seen on the data. We have conducted a workshop and training Banda-ITF Dynamics Experiment (BIDE) for data access and processing of CTD Argo floats at our campus last year (Aug 2018). About 35 participants have been attended in the training from many research centers and universities in Indonesia. We have a plan to conduct the second BIDE training and workshop on CTD Argo float data in 2019.

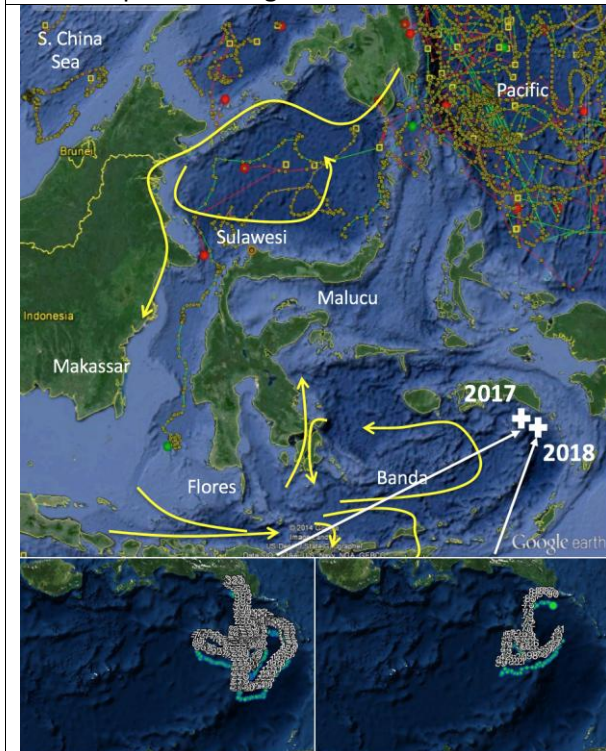


Figure 1: Trajectory of ARGO floats in the Indonesian Seas. Only one ARGO float could enter the Flores Sea flowing from the Pacific Ocean. Yellow arrows show the circulation. White crosses show the French deployments, unique in the Banda sea in 2017 and 2018. Trajectory of each float is show in the panels bellow.

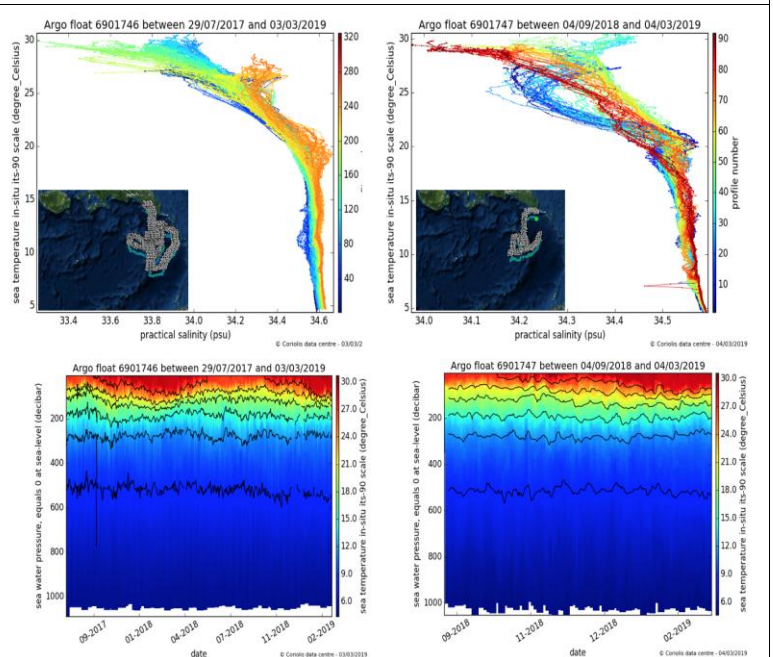


Figure 2: TS diagram and time series of the temperature acquired by the two floats deployed the 29 July 2017 and the 04 Sept 2018 in the northern eastern part of the Banda Sea. (131E, 5S).

*Future of the project :*

We propose more ARGO float deployments combined with a general strategy of monitoring the Indonesian Throughflow (ITF) in an oceanObs19 white paper reviewing the physical and biogeochemical variability within the Indonesian Seas (Sprintall et al., 2019). Collaboration is planned with USA, Australia and Indonesia. See figure 3 describing a proposed intensive pilot study.

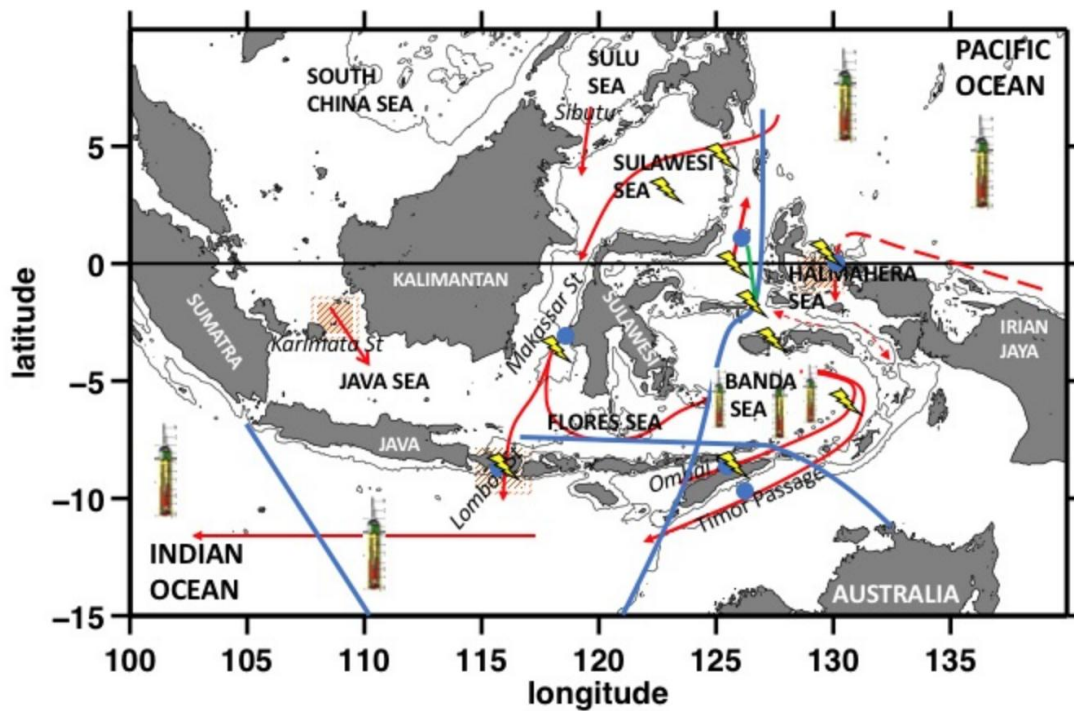


Figure 3: proposed intensive pilot study and enhanced mixing array for the Indonesian seas. The array includes moorings (blue dots); XBT transects (blue lines); acoustic tomography and/or high frequency radar (orange hatched); Argo/BGC/EM-APEX floats (float icon) and microstructure measurements (yellow lightning), in the oceanobs19 paper (Sprintall et

al., 2019)

*Nombre de publications, de communications et de thèses  
(citer au maximum 5 publications en lien direct avec le projet)*

Since deployment is quite recent we have one presentation and we are working on a paper associated to it. Agus Atmadipoera will come soon in France so we can work on the paper. In addition, we have been co-author on a recently accepted oceanobs19 paper reviewing a sustainable network for monitoring the Indonesian seas (Sprintall et al. 2019).

- Agus Atmadipoera, Ariane Koch-Larrouy, Dwiyoga Nugroho, Gentio Harsono, Pieldrien anlohy, Noé Poffa, Indra Jaya, I Wayan Nurjaya, Rahmat Hidayat, Early Insight into CTD Argo Float Measurement in Banda Sea Indonesia, BIDE experiment, Data Buoy Cooperation Panel (DBCP) Thirty Third Session Brest France, 14-17 November 2017

- Janet Sprintall, Arnold L. Gordon, Susan E. Wijffels, Ming Feng, Shijian Hu, Ariane Koch-Larrouy, Helen Phillips, Dwiyoga Nugroho, Asmi Napitu, Kandaga Pujiana, R. Dwi Susanto, Bernadette Sloyan, Dongliang Yuan, Nelly Florida Riama, Siswanto Siswanto, Anastasia Kuswardani, Zainal Arifin, A'an J. Wahyudi, Hui Zhou, Taira Nagai, Joseph K. Ansong, Romain Bourdalle-Badié, Jerome Chanut, Florent Lyard, Brian K. Arbic, Andri Ramdhani, Agus Setiawan , Detecting Change in the Indonesian Seas. *Front. Mar. Sci.* 6:257. 10.3389/fmars.2019.00257.