SUJET DE STAGE DE MA SOAC 2022-2023

*Title: Surface Dynamics in Indonesian Seas and its Relationship with the Indonesian TroughFlow (ITF)*

The Indonesian seas, including the Java Sea, Flores Sea, and Timor Sea, play a critical role in facilitating the Indonesian Throughflow, which is a major component of the global ocean circulation. This flow transports large amounts of warm, saline water from the Pacific Ocean to the Indian Ocean, affecting global climate patterns and ocean circulation. The dynamics of these seas, including their circulation patterns, water temperature, and salinity, strongly influence the strength and variability of the ITF. For example, the Java Sea is a vital pathway for the throughflow, as water from the Pacific Ocean enters through the Makassar Strait, passes through the Java Sea, and exits through the Lombok Strait into the Indian Ocean. In addition, the Indonesian seas also play an important role in the transport of freshwater, which can influence the throughflow dynamics.

The internship will involve the validation of the Symphonie ocean model using available in situ measurements of surface currents, temperature, and salinity over a period of 10 years to capture the seasonal and inter-annual variability of the oceanic circulation in the region. The goal will be to detect and analyse the circulation patterns and its main variability (eddies to mean currents). Another important phase of the research will involve the use of drifter buoys and profiling float data from MMS BMKG's project to collect in-situ measurements of surface currents, temperature, and salinity. The data collected will be used to validate the results of the Symphonie model and to investigate the temporal and spatial variability of the surface dynamics in the Indonesian Seas.

This research plan aims to contribute to a better understanding of the surface dynamics in Indonesian Seas and their relationship with the Indonesian TroughFlow. The findings of this study will provide valuable insights into the oceanic circulation in the region, and will help to inform future research and monitoring efforts.

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**Internship Plan**

Week 1: Introduction to Indonesian Seas and Indonesian Trough Flow

During the first week, the intern will be introduced to the Indonesian Seas and the Indonesian Trough Flow. The intern will be provided with scientific literature and data on the subject, and will be expected to familiarize themselves with the basic concepts, including the oceanography, geography, and the relevant physical processes.

Week 2: Introduction to Symphonie Ocean Model

In the second week, the intern will be introduced to the Symphonie Ocean model (SEA5 model). They will be provided with data sets to work with. The intern will be expected to learn how to use the model to simulate the surface dynamics in Indonesian Seas and to explore the relationships between surface currents, temperature, and salinity.

Week 3: Satellite Data Analysis

In the third week, the intern will be introduced to satellite data analysis. They will be taught how to access and manipulate remote sensing data such as sea surface temperature, Sea Surface salinity, and sea surface height. The intern will be expected to learn how to use satellite data to study the surface dynamics in Indonesian Seas, including identifying and tracking ocean currents, fronts, and eddies.

Week 4: Drifter Buoy and Profiling Float

In the fourth week, the intern will be introduced to the use of drifter buoys and profiling floats. They will learn how to analyse the data from these instruments, and will be taught how to use the data to study the surface dynamics of Indonesian Seas. The intern will be expected to learn how to use the data from these instruments to validate the Symphonie Ocean model.

Week 5: Data Analysis and Interpretation

In the fifth week, the intern will work on analysing and interpreting the data collected in the previous weeks. They will be expected to use the Symphonie model, satellite data, and data from drifter buoys and profiling floats to explore the surface dynamics of Indonesian Seas and its relationship with the Indonesian Trough Flow. The intern will be expected to identify patterns, trends, and anomalies in the data, and to develop hypotheses to explain these findings.

Week 6: Scientific Writing and Presentation

In the sixth week, the intern will focus on scientific writing and presentation. They will be expected to write a scientific report summarizing their findings and to develop a presentation to communicate their results. The intern will be expected to follow scientific writing conventions, including using appropriate technical language, referencing scientific literature, and presenting data and analysis in a clear and concise manner.

Week 7-8: Data Visualization and Communication

In the final two weeks, the intern will focus on data visualization and communication. They will be expected to use graphical and other visualization tools to present their data and analysis in a clear and visually appealing manner. By the end of the internship, the intern will have gained valuable experience in using Symphonie Ocean model, analysing satellite data, and using drifter buoys and profiling floats. The intern will have made a valuable contribution to the study of surface dynamics in Indonesian Seas and its relationship with the Indonesian Trough Flow, and will have gained valuable insights into the broader field of oceanography.