ABSTRAK

Laut Banda memiliki dinamika oseanografi kompleks karena keterhubungannya dengan Celah Lifamatola, jalur utama masuknya massa air dalam dari Samudra Pasifik ke perairan Indonesia timur. Penelitian ini bertujuan untuk menganalisis profil hidrografi serta mengestimasi tingkat kestabilan dan tingkat percampuran vertikal turbulen massa air di Laut Banda bagian barat hingga Celah Lifamatola pada November 2014. Data observasi *Conductivity, Temperature, and Depth* (CTD) dari ekspedisi Ekspedisi Widya Nusantara (EWIN) diproses menggunakan *SBE Data Processing*. Analisis dilakukan dengan menentukan kolam lapisan massa air berdasarkan stratifikasi yang kemudian dilanjutkan dengan menentukan struktur massa airnya melalui diagram T-S. Perubahan karakteristik massa air dijelaskan menggunakan penampang vertikal, kemudian diperkuat dengan interpretasi terhadap pola sirkulasi arus. Estimasi pencampuran vertikal didasarkan pada laju disipasi energi turbulen dan difusivitas eddy. Di wilayah ini terdeteksi dua sumber massa air utama dari Pasifik Selatan dan Utara, yakni *North Pacific Subtropical Water* (NPSW) dan *South Pacific Subtropical Water* (SPSW) dengan S_{max} 34,65 dan 34,97 PSU, serta *North Pacific Intermediate Water* (NPIW) dengan S_{min} 34,55 PSU. Umumnya, laju disipasi energi kinetik turbulen tinggi beriringan dengan peningkatan difusivitas *eddy* vertikal, menandakan proses pencampuran massa air. Nilai tertinggi kedua parameter ini ditemukan di lapisan termoklin Stasiun 14, Celah Lifamatola, dengan laju disipasi energi 10^{-6} W/kg dan difusivitas *eddy* 10^{-3} m²/s. Tingginya nilai ini mengindikasikan adanya proses pencampuran turbulen yang intens, yang didorong oleh pertemuan dua massa air berbeda serta pengaruh arus kuat yang melintas melalui celah sempit tersebut.

Kata Kunci: *turbulensi, percampuran massa air, CTD, profil hidrografi, Laut Banda, Celah Lifamatola*

ABSTRACK

The Banda Sea exhibits complex oceanographic dynamics due to its connection with the Lifamatola Passage, which serves as a major entry point for deep water masses from the Pacific Ocean into eastern Indonesian waters. This study aimed to analyze the hydrographic profiles and estimate the stability and intensity of vertical turbulent mixing of water masses in the western Banda Sea, extending to the Lifamatola Passage, in November 2014. Conductivity, Temperature, and Depth (CTD) observational data from the Widya Nusantara Expedition (EWIN) were processed using SBE Data Processing software. The analysis involved identifying stratified water layers, followed by the classification of water mass structures using a TS (Temperature-Salinity) diagram. Variations in water mass characteristics were interpreted through vertical sections and further supported by analysis of circulation patterns. Vertical mixing estimation was based on the turbulent kinetic energy dissipation rate and vertical eddy diffusivity. Two primary water mass sources from the North and South Pacific were detected in the region—namely, the North Pacific Subtropical Water (NPSW) and South Pacific Subtropical Water (SPSW), characterized by maximum salinity (S_{max}) values of 34.65 and 34.97 PSU, respectively, as well as the North Pacific Intermediate Water (NPIW), with a minimum salinity (S_{min}) of 34.55 PSU. Generally, high turbulent kinetic energy dissipation rates were accompanied by increased vertical eddy diffusivity, indicating active mixing processes. The highest values of both parameters were observed within the thermocline layer at Station 14, located in the Lifamatola Passage, with a dissipation rate of 10^{-6} W/kg and eddy diffusivity of 10^{-3} m²/s. These elevated values indicate intense turbulent mixing, driven by the convergence of different water masses and the influence of strong currents flowing through the narrow passage.

Keywords: *turbulence, water mass mixing, CTD, hydrographic profile, Banda Sea, Lifamatola Passage*