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F Nuzula[1*], **M L Syamsudin**[2], **L P S Yuliadi**[2], **N P Purba**[2] **and Martono**[3]
[1]Bachelor Degree, Marine Science Program, Faculty of Fisheries and Marine Science, Padjadjaran University, Jl. Raya Bandung-Sumedang Km. 21, Jatinangor, West Java 45363, Indonesia
[2]Department of Marine Science, Padjadjaran University, Jl. Raya Bandung-Sumedang Km. 21, Jatinangor, West Java 45363, Indonesia
[3]Science Technology and Atmosphere Center, National Institute of Aeronautics and Space (LAPAN), Jl. Doktor Djunjunan No. 133, Padjadjaran, Cicendo, Bandung City, West Java 40173, Indonesia

E-mail: firdaoesnoezoela@gmail.com

Abstract. This study was aimed to get the distribution of eddies spatially and temporally from Makassar Waters (MW) to Flores Sea (FS), as well as its relations with the upwelling, the downwelling, and chlorophyll-a concentration. The study area extends from 115º–125º E to 2.5º–8º S. The datasets were consisted of monthly geostrophic currents, sea surface heights, sea surface temperatures, and chlorophyll-a from 2008 – 2012. The results showed that eddies which found at Makassar Strait (MS) has the highest diameter and speed of 255.3 km and 21.4 cm/s respectively, while at the southern MW has 266.4 km and 15.6 cm/s, and at FS has 182.04 km and 11.4 cm/s. From a total of 51 eddies found, the majority of eddies type was anticyclonic. At MS and FS, eddies formed along the year, whereas at southern MW were found missing in West Season. Moreover, the chlorophyll-a concentration was consistently higher at the *eddies* area. Even though, the correlation among eddies and the upwelling downwelling phenomena was not significantly as shown by sea surface temperatures value.

1. Introduction

Makassar-Flores Sea was the area with dynamic condition of oceanography. The water masses in this region are highly influenced by two systems of main current through it, the Indonesian through flow (ITF) and Indonesia monsoonal flow (IMF) [1]. Arlindo is a current flowing through Indonesian waters from the pacific ocean to the Indian ocean caused by differences in the sea level of height [2]. Through Arlindo, some waters get influenced by El Nino Southern Oscilation (ENSO), one of them is the southern ocean of Makassar – Flores Sea which located at the center of Indonesian waters. Furthermore, this phenomenon can affect the other oceanography events such as eddies and upwelling.

IMF in the west season is characterized by water mass that moves from west to east along with west monsoon wind which lead to the accumulation of water masses in Banda Sea and resulted the downwelling events. In the east season, water mass move in the reverse direction so that the water mass in Banda Sea is empty and the upwelling occurred [1]. Primer productivity in this region can be determined based on concentration of chlorophyll-a [3], because chlorophyll-a is an important pigment which is found in phytoplankton for photosynthesis, as well can be used to identifying upwelling and downwelling phenomenon [4].