

ABSTRACT

Tropical cyclones are among the most extreme atmospheric phenomena capable of triggering heavy rainfall and causing hydrometeorological disasters. This study analyzes the relationship between the Accumulated Cyclone Energy (ACE) index of Tropical Cyclone Seroja in April 2021 and rainfall intensity as well as flood events in Kupang City. The data used include 6-hourly maximum wind speed for calculating ACE, daily rainfall data, and atmospheric dynamic parameters such as sea surface temperature, air pressure, and wind. The results show that the ACE value peaked on April 4, 2021, at $11.69 \times 10^4 \text{ kt}^2$, coinciding with the highest recorded rainfall exceeding 110 mm/day. Atmospheric conditions supported the increase in rainfall, characterized by warm sea surface temperatures, low pressure, and intensified wind speeds. The major flood event in Kupang on April 3–4, 2021, was found to be a direct consequence of the extremely heavy rainfall induced by Tropical Cyclone Seroja. These findings indicate that enhanced cyclone energy activity contributes to the intensity of heavy rainfall, which in turn increases the potential for flooding in the Kupang area.

Keywords: *ACE, tropical cyclone seroja, rainfall, atmospheric dynamics, flood.*