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Wind Velocity Climate Zonation Based on Observation Data in Indonesia Using Cluster and Principal Component Analysis

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Abstract : Principal Component Analysis (PCA) is a mathematical procedure that uses orthogonal transformation techniques to change a set of data with components that may be related become components that are not related to each other. This can have an impact on clustering wind speed characteristics in Indonesia. This study uses data daily wind speed observations of the Site Meteorological Station network for 30 years. Multicollinearity tests were also performed on all of these data before doing clustering with PCA. The results show that the four main components have a total diversity of above 80% which will be used for clusters. Division of clusters using Ward's method obtained 3 types of clusters. Cluster 1 covers the central part of Sumatra Island, northern Kalimantan, northern Sulawesi, and northern Maluku with the climatological pattern of wind speed that does not have an annual cycle and a weak speed throughout the year with a low-speed ranging from 0 to 1,5 m/s². Cluster 2 covers the northern part of Sumatra Island, South Sulawesi, Bali, northern Papua with the climatological pattern conditions of wind speed that have annual cycle variations with low speeds ranging from 1 to 3 m/s². Cluster 3 covers the eastern part of Java Island, the Southeast Nusa Islands, and the southern Maluku Islands with the climatological pattern of wind speed conditions that have annual cycle variations with high speeds ranging from 1 to 4.5 m/s².

Keywords : PCA, cluster, Ward's method, wind speed
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