Evaluasi Kesesuaian Data Curah Hujan Berbasis Radar Cuaca C-Band Terhadap Stasiun Pengukur Hujan Menggunakan Metode Koreksi Kalibrasi di DAS Ciliwung = Suitability Evaluation of Rainfall Data Based On C-Band Radar to Rain Gauge Stations by Using Calibration Correction Method in The Ciliwung Watershed

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Abstrak

Hujan merupakan salah satu parameter penting dalam proses hidrologi. Pengukuran curah hujan oleh stasiun pengukur hujan belum dapat mewakili sebaran spasial dan temporal. Di daerah pegunungan, sebaran spasial hujan sangat bervariasi dan cenderung lebih tinggi dibandingkan daerah dengan topografi yang lebih rendah. DAS Ciliwung bagian hulu terletak di area pegunungan dengan elevasi 297-2982 mdpl, sedangkan area hilir terletak di area dekat pantai dengan elevasi 0-25 mdpl. Lokasi penelitian ini dilakukan di DAS Ciliwung karena salah satu DAS paling kritis di Indonesia dengan masifnya pembangunan yang berpengaruh terhadap fenomena banjir di bagian hilir, yaitu Jakarta. Radar cuaca merupakan salah satu instrumen yang dapat merepresentasikan kondisi spasial dan temporal hujan dengan lebih baik. Namun, setelah dievaluasi data curah hujan berbasis radar cuaca belum sesuai terhadap data stasiun pengukur hujan. Oleh karena itu, penelitian ini bertujuan untuk melakukan koreksi dan evaluasi kesesuaian data curah hujan berbasis radar cuaca terhadap stasiun pengukur hujan di DAS Ciliwung. Data yang digunakan adalah data sekunder berupa data curah hujan dari radar cuaca C-Band dan stasiun pengukur hujan di 6 titik area hulu dan 9 titik area hilir. Metode koreksi data curah hujan berbasis radar cuaca menggunakan metode koreksi kalibrasi. Uji kesesuaian dilakukan menggunakan tiga metode, yaitu Nash Sutcliffe Efficiency (NSE), Root Mean Square Error (RMSE), dan Percent Bias (PBias). Perolehan hasil NSE, RMSE, dan PBias menggunakan data curah hujan radar cuaca setelah dikoreksi menunjukkan bahwa metode koreksi kalibrasi yang digunakan mampu meningkatkan tingkat akurasi dan keandalan data curah hujan secara signifikan walaupun di beberapa titik penelitian secara numerik masih belum memenuhi persyaratan. Hasil terbaik terdapat di Stasiun Pulomas yang ditandai dengan perubahan nilai NSE dari 409,06 menjadi 0,62; nilai RMSE dari 574,66 menjadi 17,54; dan nilai PBias dari 2062,02 menjadi -30,84. Secara tren pencatatan data curah hujan juga sudah sesuai dengan data stasiun pengukur hujan sehingga mampu menggambarkan pola hujan di DAS Ciliwung. .....Rain is one of the important parameters in the hydrological process. Rainfall measurements by rain measuring stations cannot yet represent spatial and temporal distribution. In mountainous areas, the spatial distribution of rainfall varies greatly and tends to be higher than in areas with lower topography. The upstream part of the Ciliwung watershed is located in a mountainous area with an elevation of 297-2982 meters above sea level, while the downstream area is located in an area near the coast with an elevation of 0-25 meters above sea level. The location of this research was carried out in the Ciliwung watershed because it is one of the most critical watersheds in Indonesia with massive development that affects the phenomenon of flooding downstream, namely Jakarta. Weather radar is one of the instruments that can better represent the spatial and temporal conditions of rain. However, after evaluation, rainfall data based on weather radar is not in accordance with the data of rain measuring stations. Therefore, this study aims to correct and evaluate the suitability of weather radar-based rainfall data for rain measuring stations in the Ciliwung watershed. The

data used is secondary data in the form of rainfall data from C-Band weather radar and rain measuring stations at 6 points in the upstream area and 9 points in the downstream area. The rainfall data correction method based on weather radar uses the calibration correction method. The conformity test was carried out using three methods, namely Nash-Sutcliffe Efficiency (NSE), Root Mean Square Error (RMSE), and Percent Bias (PBias). The results of NSE, RMSE, and PBias using weather radar rainfall data after correction show that the calibration correction method used is able to significantly improve the accuracy and reliability of rainfall data even though at some research points numerically it still does not meet the requirements. The best results were found at Pulomas Station which was marked by a change in the NSE value from -409.06 to 0.62; RMSE value from 574.66 to 17.54; and the PBias value from 2062.02 to -30.84. In terms of the trend of recording rainfall data, it is also in accordance with the data of rain measuring stations so that it is able to describe rainfall patterns in the Ciliwung watershed.