



Development of Climate Data Masking Interface Service based on Spatial Index Using PyWPS

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Recently, the use of global and regional climate data created by CF-NetCDF (climate and forecast – network common data form) is increasing to analyze and predict unusual climate events due to climate change. CF-NetCDF is an OGC (open geospatial consortium) standard and its metadata is written according to CF conventions. The representative climate data written in CF-NetCDF format is CMIP5 (Coupled Model Intercomparison Project Phase 5). Researchers generally use climate data extracted in the form of a rectangle that covers the study area. The point-in-polygon algorithm is mainly used as a data extraction method. However, to extract elaborately climate data in a study area where has slightly indented terrain, such as national boundaries and rivers, is time-consuming, depending on the spatial resolution of the data, the extent of the study area, and the number of data. To solve this problem, an improved masking algorithm is proposed using R-tree index algorithm. Also, OGC WPS (Web Processing Service)-based climate data masking interface service is developed using PyWPS and the proposed algorithm. To compare the performance of the extraction algorithm without spatial index algorithm and the proposed algorithm, Indonesian border data which includes many islands and climate data with a spatial resolution of 50 km were used. As a result, in the case of point-in-polygon algorithm, their computational time was about 207259 seconds and 215 seconds, respectively. Therefore, the proposed algorithm can be used for extracting not only climate data, but also environmental data effectively. In addition, the OGC WPS-based climate data masking interface service developed using the proposed algorithm can be used as an important part in developing real-time climate data analysis system that requires fast computational performance.