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**Abstract: Distinguishing Haze from Cloud in Satellite Imagery Based on Fuzzy Clustering Method**

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A novel method to distinguish haze from cloud in satellite imagery is proposed. Different from conventional methods being used in satellite cloud products and aerosol products, fuzzy clustering, a machine learning algorithm is implemented. Each pixel in satellite image is assigned with a membership grade, indicating the degree to which it belongs to the category of haze or cloud. Multiple reflectance bands and emission bands, as well as their special distribution and texture characteristics are used as input of clustering process. Local terrain information is also referred while making decision in relatively ambiguous situations. Our method can draw a borderline between haze and cloud region, which is visually and scientifically plausible. Results are validated using meteorological parameters and pollution indices, showing an optimized partition decision when compared to MODIS class-6 cloud and aerosol products.