

Cloud inhomogeneity effect and its impact on cloud retrieval using passive satellite instruments

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Cloud optical and microphysical properties, together with cloud-top height, determine cloud radiative effects and impact Earth energy budget. While nature clouds are horizontally and vertically inhomogeneous, most of current retrieval algorithms consider cloud as a homogeneous layer in their forward models. In this study, cloud inhomogeneity effects are investigated in two different ways: (1) cloud sub-pixel inhomogeneity (horizontal inhomogeneous) and (2) vertical inhomogeneity (e.g., cloud microphysical property varies with height). We will show the impact from cloud inhomogeneity effects on current retrieval algorithms relying on observations of passive satellite instruments (e.g., infrared (IR) and/or solar reflectance observations). We also developed retrieval correction method to reduce biases due to cloud inhomogeneity effects.

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