D073-P008 Time: May 30 17:00-18:30

An evaluation of anisotropic model using the mesoscale non-hydrostatic model

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http://www2.crl.go.jp/ka/radioastro/index-J.html

Radio signal delay associated with the neutral atmosphere is one of the major error sources for space-based geodetic techniques such as the Global Positioning System (GPS) and Very Long Baseline Interferometry (VLBI). Anisotropic mapping functions are considered a powerful tool for removing the effects of atmospheric variability from GPS and VLBI analyses at present. Atmospheric gradient parameters are retrieved by using a simple linear form in these mapping functions. However, retrieved gradient parameters have not sufficiently validated in the context of intense mesoscale phenomena such as the passing of cold fronts, heavy rainfall events, and severe storms so far. It is important to reveal the limitation of the anisotropic mapping functions under these meteorological conditions. Thus, we are evaluating anisotropic mapping functions by comparing with the ray-traced slant delay through the non-hydrostatic numerical weather prediction model (NHM). We use two different NHM with 250 m and 1.5 km horizontal resolution in order to investigate horizontal variability of the atmosphere in detail. We will describe our findings based on these comparisons.