Title	GEONEX: Challenges in producing MODIS-like land products from a new generation of geostationary sensors

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Abstract	The new generation geostationary (GEO) remote sensors (GOES-R ABI, Himawari AHI, and FY4 AGRI) provide high frequency (5-15 minute) observations spatially/spectrally similar to MODIS/VIIRS for land monitoring. These new features of GEO satellite sensors make producing MODIS like land products for terrestrial monitoring possible. The NASA Earth Exchange (NEX) team developed the GEONEX pipeline that is containerized, deployable on NASA Pleiades supercomputer as well as public cloud platforms (e.g. AWS). The processing pipeline is designed to take Himawari Standard Data (HSD) and GOES-16 L1b to generate surface reflectance (SR) and other high-level land remote sensing products. In order to produce low-Earth-orbiting (LEO) remote sensing compatible land products, inter-comparison between Himawari AHI and MODIS Terra/Aqua has been conducted in this research work. Comparisons of TOA reflectance and surface reflectance between AHI and Terra/Aqua are presented. Ray-Matching method was used to locate the co-located pixels, where GEO and LEO sensors look at the land target with similar Viewing Zenith Angle (VZA) and Viewing Azimuth Angle (VAA) simultaneously. Here, we address challenges associated with the selection of qualified pixels of similar solar illumination condition and atmosphere path. We used strict criterion to constrain the pixel selection: the time difference between GEO and LEO observations is less than +-2.5 mins, the cosine of VZA difference is less than 1%, and the VAA difference is less than 10 deg. We also discuss the strong radiometric consistency that the new generation GEO sensors along with the popular LEO sensors would benefit the environmental remote sensing community.