

# Mapping seasonal forest background reflectivity over North Asia with Multi-angle Imaging SpectroRadiometer (MISR) data

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**Abstract:** Forest background optical properties are greatly important in retrieving biophysical variables of forest canopy and modeling the process of ecosystem. It could not only be used to extract useful information about forest canopy from mixed spectral signals received by sensors but also be regarded as a characteristic to differentiate between fertile and infertile stands. Driven by these calls, seasonal forest background reflectivity over North Asia forest areas was mapped by using a geometrical optical modeling theory with the 4-Scale model and Multi-angle Imaging Spectro Radiometer (MISR) data from two angles' observation at 1.1 km resolution. The results show that there are clear spatial and temporal patterns of forest background reflectivity in North Asia, especially in high latitude where the background alternates between snow and vegetation in a year. Background reflectance in deciduous broadleaf forest differs from that in coniferous and is more sensitive to the cover of canopy (overstory). The comparison between the understory LAI estimated with background reflectance and that retrieved from a simulated relationship demonstrates a good consistency. The multi-year monthly combined maps of background reflectivity cover most of our study area, allowing us to improve the estimation of biophysical parameters of forest canopy.

**Keywords:** Forest background, reflectivity, North Asia, MISR