Examining the Impact of Elevation Mask on Atmospheric Delay Errors in GNSS Static Observations

PAMT Rupathunga[1#], JMO Jayamanne[1,2], and PAT Hansamal[1]

[1]Department of Spatial Sciences, General Sir John Kotelawala Defence University, Sri Lanka
[2]Nottingham Geospatial Institute, University of Nottingham, UK

[#]36-sps-0019@kdu.ac.lk

The study aims to investigate the impact of different mask angles on the precision of GNSS static data acquisition and to analyze the correlation between precision and diverse refraction models. The angle of the elevation mask is utilized to ascertain the minimum elevation above the horizontal plane that is deemed acceptable for the detection of satellites. This study focused on the Southern province of Sri Lanka, and the investigation employed control points within this region. Data was collected using Topcon GR-5 devices and processed with Leica Geo Office software. The accuracy of the system was assessed by considering various mask angles and refraction models. The results reveal a negative correlation between elevation mask angles and atmospheric delay errors. A $15°$ mask angle shows fewer errors compared to $10°$ angle. The study suggests that GNSS observations without ionospheric and tropospheric models achieve better precision with mask angles exceeding $15°$, reducing atmospheric delay errors. The results of this study can help professionals choose the best mask angle for their GNSS applications and increase the overall precision of static data collecting.

Keywords: *ionospheric error, tropospheric error, elevation mask*