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Session 10B Paper 3

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GNSS Observations from Venetie, Alaska during ISINGLASS sounding rocket mission

A new GNSS receiver will be installed in February 2017 in Venetie, Alaska, 250 km north of Fairbanks, with the goal of enhancing space weather monitoring. Although southern Alaska has a fairly dense network of GNSS receivers due to the geodesy community's interest in plate motion (e.g. the Aleutian Trench), northern Alaska is sparsely populated with GNSS networks, despite the fact that many space weather events begin in this region. The goal of placing a receiver in Venetie is to provide more line-of-sight and differential total electron content (TEC) measurements in the important auroral/sub-auroral region of Alaska. The Venetie data will aid studies involving auroral ionospheric structuring at both small and large scales. This location also has the benefit of co-located optical equipment. The GNSS receiver to be installed will track all existing GNSS constellations: GPS, GLONASS, Galileo, BeiDou, IRNSS, QZSS, and SBAS. Ground-based receiver data from these additional GNSS constellations will increase the density of TEC measurements in this dynamic region.

In addition to its space weather monitoring function, the Venetie receiver will play an active role during the ISINGLASS sounding rocket mission (February 2017, Poker Flat Rocket Range, Alaska). ISINGLASS is designed to sample the auroral ionosphere at multiple locations simultaneously and to obtain gradient measurements of plasma parameters. The plan is that two identical rockets will be flown into two separate auroral events (ie, quiet early evening arc vs dynamic rayed arc). Each rocket has a large sub-payload, and four small deployable payloads. The in-situ measurements of plasma parameters at multiple locations will be stitched together using ground based measurements and data assimilation to produce a localized map of plasma parameters and gradients. Venetie is underneath the apogee of the ISINGLASS rocket trajectories, and the GNSS receiver there will provide valuable background scintillation and total electron content (TEC) data and differential TEC data for this experiment.