

Exploring the use of cell phone GNSS receivers for global monitoring of the ionosphere

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Accurate characterization of the ionosphere in response to space weather events has important implications for the effective use of high-frequency (HF) communications in civilian and military operations, including, but not limited to, emergency services, amateur radio, aviation, and over-the-horizon radar. This study investigates the use of cell phone Global Navigation Satellite System (GNSS) technology to monitor and study highly variable phenomena in the ionosphere, such as the aurora at high-latitudes or scintillation at the equator. Field campaigns to high and mid-latitudes will be summarized here, emphasizing the sensitivity of cell phone GNSS receivers to pick up on space weather events such as traveling ionospheric disturbances. Preliminary analysis on the potential to combine data from various cell phone manufacturers (e.g. Hauwei, Samsung, Google, LG and Moto) to enhance data quality will also be presented. Based on this research the potential to collect data from millions of cell phones GNSS technology may allow for real-time monitoring and measuring of the ionosphere to occur on an unprecedented global scale.

Keywords: GNSS, cell phone, space weather