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## On the phase detrending to disentangle refraction and diffraction on GNSS signals: a case study over Antarctica

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We investigate the reliability of the phase scintillation index determined by receiving Global Navigation Satellite System (GNSS) signals at ground in the high-latitudes. To the scope, we report about the capabilities of recently introduced detrending scheme based on the signal decomposition provided by the Fast Iterative Filtering (FIF) technique. This detrending scheme enables a fine tuning of the cutoff frequency for phase detrending used in the phase scintillation index definition, aimed at disentangling diffraction and refraction effects. On a single case study based on GPS and Galileo data taken by a GNSS Ionospheric Scintillation Monitor Receiver (ISMR) in Concordia Station (Antarctica), we show how the FIF-based detrending allows deriving adaptive cutoff frequencies, whose value changes minute-by-minute. They are found to range between 0.4 Hz and 1.2 Hz. This allows better accounting for diffractive effects in phase scintillation index calculation and also showing the limitations on the use of such index, being still widely used in the community, both to characterize the features of ionospheric irregularities and to adopt mitigation solutions.