

GNSS RO Sampling for Climate Purposes

Stephen Leroy

Harvard University

leroy@huarp.harvard.edu

Because of its peculiar calibration properties, insensitivity to clouds, and global coverage, GNSS radio occultation is ideally suited to climate monitoring. Because its bases are navigation systems, it also offers products related to geopotential, thus allowing measurement of differential thermal expansion and inference of geostrophic winds. Use of RO data for climate purposes, though, requires significantly less sampling than for purposes of numerical weather prediction.

In using RO data for climate monitoring purposes, due care must be given to the diurnal cycle, periodic weak singularities in the sampling pattern, and effective spatial and temporal resolution. Earlier work suggests that a single LEO receiver in a polar orbit may be adequate for long-term climate monitoring but obtains relatively poor effective spatial and temporal resolution. If diagnosis of geostrophic winds is required, a constellation of multiple satellites and GNSS transmitters is preferred. Preliminary results of a study of different candidate LEO GNSS RO configurations will be presented.