Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04111, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04111
EGU General Assembly 2008

Error Estimates of Bending Angles obtained from Radio Occultation Data in the Presense of Strong Horizontal Gradients

K. B. Lauritsen (1) and M. E. Gorbunov (2)

(1) DMI, Copenhagen, Denmark (kbl@dmi.dk); (2) Institute of Atmospheric Physics, Moscow, Russia

Radio occultation data with atmospheric multipath behavior have attracted much attention recently. It has been shown that methods based on Fourier integral operators (CT, FSI, CT2) can effectively unfold multipath behavior. Furthermore, this approach gives a high accuracy for the retrieved bending angle profiles. Canonical Transform (CT) and Full-Spectrum Inversion (FSI) depend on the multipath unfolding by projecting the ray manifold to the axis of the effective impact parameter. For a spherically-symmetric atmosphere the effective impact parameter equals the ray leveling distance, both at the transmitter and the receiver. In the presense of horizontal gradients these leveling distances will be different, the difference being a functional of the horizontal gradient of the refractivity along the ray. The effective impact parameter is thus a function of the leveling distances. As a result, in the presense of strong horizontal gradients the projection of the ray manifold to the effective impact parameter axis may become non-unique, thus impeding a complete multipath unfolding. In this situation it is, however, possible to estimate the CT/FSI bending angle error using the radio holographic technique. We present examples of simulated radio occultations obtained with an analytical model of an atmospheric front and with global atmospheric gridded fields from ECMWF re-analyses. We show how the radio holographic quality control and error estimation techniques work in this situation.