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GNSS tomography model reparametrization

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The GNSS tomography is a technique that is inspired by concept of Computer Tomography and principles of Radon transform in both iterative and non-iterative way. It produces, based on the integrated measure of troposphere delay into the direction of satellite, a 3D discretized picture of refractivity in time.
A strong GNSS meteorology community spend a lot of effort on: 1) finding an optimal voxel horizontal and vertical extent, 2) applying sophisticated inversion techniques, including family of Algebraic Reconstruction Technique, truncated Singular Value Decomposition, robust filtering, 3) adding and removing horizontal and vertical constraints and pseudo-observations, 4) weighting observations and a priori data, 5) running tomography in near-real time and real-time, 6) investigating use of models in nowcasting and forecasting. However, recently a major improvement in the quality of retrieval is due to a change of model parametrization; models became more flexible, robust and representing current satellite and receiver position.
In this study, we compare a number of parametrisation (static, trilinear, bilinear and irregular) and its impact on the final solution. Moreover, we propose a machine learning solution that is automatically forming a mesh of points representing refractivity of the investigated part of the troposphere.