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# Tomography through Bayesian inversion - can we afford it?

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Velocity tomography, is now routinely used to image velocity
distributions which are subsequently interpreted in terms of the Earth or rock-sample structure. This technique has been successfully used in detailed mapping of the Earth in various scales ranging from the whole globe until very local rock-mass structure, e.g. in mines.

At the early stage of the development the velocity tomography technique used the arrival time data only due to a limited computational resources. Currently, attempts of velocity imaging from the full waveform records are also successfully undertaken. However, in both cases optimization-based inversion techniques are still most often used for solving problems in hand and the alternative approach based on the probabilistic inverse theory is said to be impractical due to a demand of huge computational power.

In this presentation we discuss this point thoroughly. We show that two new computational techniques namely the fast eikonal solvers based on the Godunov discretization and GPPGU (general purpose computing on graphics processing units) make a Bayesian travel-time based tomography possible on the global scale. We also expect that the waveform-based Bayesian tomography which can now be performed occasionally at local (for example, mining) scale will soon become widely used