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## Atmospheric radiative transfer model Siro and its applications

Jukka Kujanpää, Erkki Kyrölä  
Finnish Meteorological Institute

In this presentation we describe the atmospheric radiative transfer model Siro and show examples of its use at the Finnish Meteorological Institute. Siro is a statistical Monte Carlo model simulating the photon paths backwards from the detector to the source. This approach is effective in a typical application where the detector is a narrow field of view satellite instrument and the source, the Sun, has a very wide field of view. The Monte Carlo approach has many benefits: various physical processes can relatively easily be included in the simulation, the sphericity of the atmosphere can readily be taken into account and the simulated photon paths provide valuable information on the contribution atmospheric constituents on the measured spectrum. In our applications, radiative transfer model is typically needed as a forward model for inversion algorithms to derive atmospheric content from a remotely measured spectrum. Challenges in using a statistical forward model in atmospheric inversion problems are also discussed.