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Quantifying cloud development from geostationary observations

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Clouds and their interaction with short- and longwave radiation represent one of the major uncertainties in our understanding of global climate change. The presence of clouds, particularly of bright low-level water clouds, doubles the Earth's albedo and they are responsible for half of the solar radiation reflected into space.
Contrary to spaceborne, polar-orbiting observations which are of great detail at fixed time we focus on spaceborne time-resolved measurements of the Spinning Enhanced Visible and InfraRed Imager (SEVIRI) aboard Meteosat Second Generation. We present an innovative method to track warm low-level clouds. The method widely used in experimental fluid mechanics and known as particle image velocimetry (PIV) [1, 2] relies on basic pattern matching. The principle of pattern matching is usually referred to as cross-correlation. It tells us something about displacements and enables the reconstruction of cloud trajectories. Thereby, we quantify cloud development and in combination with the CLAAS-2 dataset [3] we characterize temporal changes of cloud properties.

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