



## **Spatially non-stationary downscaling of cloud coverage**

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High resolution NWP models make it possible to resolve highly variable fields such as cloud coverage and precipitation. This increase in resolution also makes the models far more expensive to run. On the other hand, the small-scale variability of moist fields means that large ensembles are needed to fully characterise the predictive uncertainty. Unfortunately, combining high spatial resolution with a large ensemble size is not possible in operational systems.

This work takes a complementary approach, using a statistical model to downscale low resolution cloud coverage fields to a higher resolution. This approach has its own challenges. Cloud coverage has features covering a broad range of scales, and its character is highly non-stationary and regime-dependent, making it challenging for many spatial statistics models. We here investigate a non-stationary Gaussian random field model conditioned on the low resolution input. The model is fully probabilistic, and able to capture some of the essential features of cloud coverage data.