How representative are observations?
Spatio-temporal issues when using observations

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Abstract
Observations are considered the lifeblood of science: they are the closest we can come to knowing the truth. But are they fit for purpose? Each observation, whether a satellite pixel or an in-situ measurement, only represents a small spatio-temporal domain. When using these observations we often implicitly assume they are representative of a much larger spatio-temporal domain. This is particularly the case when evaluating global models but also occurs when comparing two observations (e.g. evaluation of a satellite product). The 'errors' introduced by this assumption can be substantial and are often comparable, if not larger, than measurement/retrieval uncertainties. I will discuss attempts to estimate such representation errors, and discuss ways to reduce them.

Biography
I have a PhD in astrophysics (Utrecht University, the Netherlands) but have since worked in atmospheric science. First on satellite retrievals of trace gases and clouds (KNMI, the Netherlands and NICT, Japan) and later on aerosol data assimilation and model evaluation (University of Tokyo, Japan and University of Oxford, England). Since 2022 I am an assistant professor at the Vrije Universiteit Amsterdam (The Netherlands) where I use (satellite) observations to improve aerosol models.