# Spatiotemporal models for irregular and large environmental data sets

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Monday, 15 April 2024, 08:15, ZT 702

My focus will be on my research's methodological and empirical contributions. Regarding the first point, I will give a short overview of our spatial autoregressive conditional heteroscedasticity models, statistical monitoring of AI applications, as well as our works on regularised high-dimensional estimation of spatial dependence structures. Then, I will shift the main focus to the results of two case studies, thereby emphasising the empirical contributions -- one about the morphological evolution of coastal profiles and one about the usage patterns of a bike-sharing system. Whereas the first data set is highly irregular and often has incomplete measurements (see Figure), the second data set has a very detailed but regular temporal resolution. For both cases, we applied a functional model, which accounts for latent spatial and temporal effects, in combination with a spatial subsampling / bootstrap approach. I will show how this model can be used in two completely different situations and how we made the procedure scalable while accounting for the full spatial and temporal dependence.
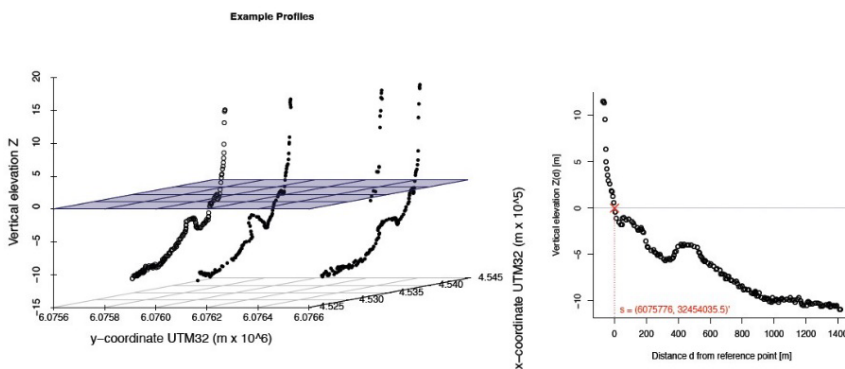
Raw data from four exemplary profiles showing all measured points at their locations.