Why select an area for download of data instead of a single point?

Climate impact assessments are often made for local scales, using results from regional or global climate models, which cover a large spatial area. When using these results for local, small-scale assessments, it is important to consider sufficient multiple grid boxes of a region. The representation of the results is more reliable when an entire region is considered.

Why is it not appropriate to use only one grid box in the majority of cases?

When using only one grid box instead of multiple boxes, there can be model noise at the scale of single grid boxes. This can lead to an over-interpretation or inappropriate application of climate information, which consequently reduces the credibility of the results. In general, each grid box represents a grid box mean value.

How to get local information?

There are several methods and techniques available to extract local information from climate model output (IPCC-TGICA 2007). Three well-recognized approaches are:

1. **Dynamical downscaling** (see FAQ sheet)
2. **Statistical downscaling** (see FAQ sheet)
3. **Simple interpolation** (averaging the number of grid boxes surrounding and including the study area grid box).

Overall, dynamical and statistical downscaling methods are the most sophisticated methods to extract local information from regional or global models. If dynamical and statistical downscaling is not possible due to limited computational resources or limited observational data availability, simple interpolation methods can be useful in some applications.

It has been suggested that the minimum effective spatial resolution of a site should be defined by at least 4 model grid boxes for coarser resolution models (GCMs) and 9 model grid boxes for higher resolution models (RCMs) (Stocker et al., 2010, EURO-CORDEX guidelines, 2017). However, in complex topography, averaging may result in the loss of specific (orographic induced) grid box results (Maraun and Widmann, 2015). For sites at the coast or in mountainous areas other approaches might be considered to define representative regions.