

Regional re-analysis without regional data

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Global re-analyses suffer from inhomogeneities, as they process data from networks under development. However, the *large-scale component* of such re-analyses is mostly homogeneous. In most cases additional local observational data add to a better description of regional details and less so of large-scale states. Therefore, the concept of downscaling may be applied for homogeneously complementing the large-scale state of a global re-analyses *with regional detail* – wherever the condition of homogeneity of the large-scales is fulfilled.

Technically this can be done by using a regional climate model, or a global climate model, which is constrained on the large scale by spectral nudging. This approach has been developed and tested for the region of Europe, and a skillful representation of regional risks – in particular marine risks – was identified. While the data density in Europe is considerably better than in most other regions of the world, even here insufficient spatial and temporal coverage is limiting risk assessments. Therefore, downscaled data-sets are frequently used by off-shore industries.

We have run this system also in regions with reduced or absent data coverage, such as the *Lena catchment* in Siberia, in the *Yellow Sea/Bo Hai region* in East Asia, in *Namibia* and the adjacent Atlantic Ocean. Also a global (large scale constrained) simulation has been. **It turns out that spatially detailed reconstructions of the state and change of climate in the recent three to six decades are doable for any region of the world, at least for extra-tropics.**

The different data sets are archived and may freely be used for scientific purposes. Of course, before application, a careful analysis of the quality for the intended application is needed, as sometimes unexpected changes in the quality of the description of large-scale driving states prevail.