



Spatial similarity of precipitation – Linking small and large scales

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A theoretical study is performed to study the similarity of precipitation among regions of different sizes. The study is first performed in the Baltic Sea basin and later to be expanded to larger domains. The study was conducted by dividing the whole domain into various sized, arbitrarily shaped regions, ranging from 1000 km² to 1000,000 km². Observations were made to see whether or not among any of those regions, combined or not, a similarity, or “link”, in annual precipitation time series (1901-2000) can be found. By testing through smoothly changing scales, scaling rules of similarity are expected to be found. The Baltic result suggested the existence of vast number of similar links; especially, when a number of (3-5) smallest test regions (about 1000 km²) were combined, they showed strongest power in find its similar counter-parts, regardless of sizes. Put it in another way, for any single chosen region, the size of which can vary between 1000 km² to 1000,1000 km², one can always found the largest number of similar regions by combining a few smallest regions. There is vast number of similar links between the smallest and largest scale tested; and such links also exist between regions separated by far distance. The study also showed the potential to transfer this result into actual catchments and into discharge data.