Geophysical Research Abstracts
Vol. 14, EGU2012-10021, 2012
EGU General Assembly 2012

Summer Rains in the Upper Blue Nile Basin: half a century of past and future spatiotemporal patterns

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During the last century the upper Blue Nile Basin (BNB) has undergone major changes in land use, and is now facing changes in climate. Rainfall over BNB supplies 2/3 of the water to the Nile and supports a large population living mainly on subsistence agriculture. Regional food security is sensitive to both the amount and timing of rain. In this study the timing, duration and intensity of summer rains (Kiremt) and dry season (Bega) were investigated over the past half-century using data from 19 meteorological stations. The potential impact of climate change on these in the coming half-century was explored using a down-scaled ECHAM5/MP1-OM scenario. Over the past 50 years the amount, onset and duration of Kiremt rains and rain-free Bega days, have exhibited a consistent spatial pattern. The spatially averaged annual rainfall was 1470 mm of which 93% was Kiremt rain. The average Kiremt rain and number of days was higher in the southwest (322) and decreased towards the north (136). In 2050 – 2100, the annual mean rainfall is predicted to increase by 6% and maintain the same spatial pattern as in the past. A larger change in annual rainfall is expected in the southwest (ca. +130 mm) with a gradually smaller change towards the north (ca. +70 mm). The change in average Kiremt rainfall is predicted to be small (+4%) with a more pronounced increase towards the southwest. The results highlight the need to account for the characteristic zonation across the region when planning water management within the BNB.