

Analysis of meteorological and hydrological measurement time series in the Rietholzbach research catchment for the 30 year period 1976 - 2005; with special consideration of the dry summer 2003

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Abstract

35 years ago ETH Zurich initiated hydrological research on ground water formation and storage as a consequence of water shortages in Switzerland due to relatively dry climatic conditions at that time. Research mainly focused on the relationships between climate and the terrestrial water cycle. The ETH-based research group "Hydrologie" at the "Versuchsanstalt fuer Wasserbau, Hydrologie und Glaziologie (VAW)" built the infrastructure for operating a research catchment at Rietholzbach during 1974-1976.

The research catchment served as a foundation for enhancing integrative knowledge on both measurements (rainfall, runoff, groundwater storage and soil moisture) and modeling (hydrological runoff models, runoff prediction, climate change impacts on the terrestrial hydrological cycle) and it was a valuable tool in teaching and for hydrological and micrometeorological field courses. Funding from ETH and the Swiss National Science Foundation allowed achieving a highly competitive research environment which led to a series of widely acknowledged science results.

The above mentioned research group "Hydrologie" (lead by H. Lang) became part of the group "Klimatologie" (lead by A. Ohmura) in 1983 and belonged to the ETH Department for Earth Sciences and the Institute for Geography. The latter is nowadays known as the ETH Institute for Atmospheric and Climate Science (IACETH).

Since 2005 a 30 year long continuous measurement record for a large set of surface climatic and soil hydrological variables is available from the Rietholzbach catchment. This present report analyzes the full 1976-2005 dataset, and is largely based on the diploma thesis of Michael Moesch (2001) and the term project of Seraina Badertscher (2005). The dataset includes the very unusual and dry summer 2003, which is given special attention here. The report is enhanced by shorter time series of both soil moisture and global radiation, which have started in later years of the research catchment operational period. The report concludes with a review of the complete set of peer reviewed publications, dissertations and other publications resulting from the Rietholzbach research activities.