Geophysical Research Abstracts,
Vol. 11, EGU2009-12419, 2009
EGU General Assembly 2009

Spectral parameterisation of rainfall-runoff models in ungauged basins

S. Castiglioni, A. Montanari, and A. Castellarin
University of Bologna, DISTART, Bologna, Italy (simone.castiglioni@mail.ing.unibo.it)

Parameter estimation of rainfall-runoff models in ungauged basins is a challenging task that is often dealt with in practical applications, given that hydrological observations are often sparse or unavailable in many countries of the world. This study focuses on calibrating an assigned rainfall-runoff model basing on its spectral properties. Spectral calibration offers the advantage of exploiting the persistence and variability behaviours of the river flow regime, which in turn can be effectively related to the dominant climate and catchment behaviours. In detail, we propose to estimate the spectral properties of the river flow regime depending on geomorphological and climatic descriptors of the contributing catchment, and calibrate the hydrological model by optimising the fit of the spectral properties themselves. The proposed techniques is applied to 13 basins located in central Italy, that were treated as ungauged. In particular, an extended analysis has been carried out to relate the spectral properties of river flow, resembled by the mean value, μ, variance, σ^2, and lag-one autocorrelation coefficient, ρ_1, of the river discharge series, to the geomorphological and climatic characteristics of the contributing catchment. An automatic optimisation is then used to identify the optimal set of model parameters, by minimising the weighed sum of the relative squared errors in the reproduction of μ, σ^2 and ρ_1. The results confirm the effectiveness of proposed methodology and show that the spectral properties of the river discharge contain important information about the hydrological regime of a given basin.