

Home

Online Library HESS

- Recent Final Revised Papers
- [Volumes and Issues](#)
- Special Issues
- Library Search
- Title and Author Search

Online Library HESSD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
2.270

ISI
indexed



[Volumes and Issues](#) [Contents of Issue 3](#)

Hydrol. Earth Syst. Sci., 6, 515-526, 2002
www.hydrol-earth-syst-sci.net/6/515/2002/

© Author(s) 2002. This work is licensed
under a Creative Commons License.

The influence of riparian-hyporheic zone on the hydrological responses in an intermittent stream

A. Butturini, S. Bernal, S. Sabater, and F. Sabater
Department of Ecology, University of Barcelona, Avd. Diagonal, 645 08028
Barcelona, Spain
Email for corresponding author andrea@porthos.bio.ub.es

Abstract. Stream and riparian groundwater hydrology has been studied in a small intermittent stream draining a forested catchment for a system representative of a Mediterranean climate. The relationship between precipitation and stream runoff and the interactions between stream water and the surrounding riparian groundwater have been analysed under a wide spectrum of meteorological conditions. The hypothesis that the hydrological condition of the near-stream groundwater compartment can regulate the runoff generation during precipitation events was tested. Stream runoff is characterised by a summer dry period, and precipitation input explained only 25% of runoff variability over the study period ($r^2 = 0.25$, d.f. = 51, $p < 0.001$). The variability of precipitation v. stream runoff is explained partly by the hydrogeological properties of the riparian near-stream zone. This zone is characterised by high hydrological conductivity values and abrupt changes in groundwater level in summer. The summer dry period begins with a rapid decrease in near-stream groundwater level, and ends just after the first autumnal rain when the original groundwater level recovers suddenly. Within this period, storms do not cause major stream runoff since water infiltrates rapidly into the riparian compartment until it is refilled during the subsequent winter and spring; then the precipitation explains the 80% of the stream runoff variability ($r^2 = 0.80$, d.f. = 34, $p < 0.001$). These results suggest that the hydrological interaction between the riparian groundwater compartment and the stream channel is important in elucidating the hydrological responses during drought periods in small Mediterranean streams.

Keywords: riparian zone, groundwater hydrology, runoff, intermittent stream, Mediterranean climate

[Final Revised Paper](#) (PDF, 957 KB)

Citation: Butturini, A., Bernal, S., Sabater, S., and Sabater, F.: The influence of riparian-hyporheic zone on the hydrological responses in an intermittent stream, Hydrol. Earth Syst. Sci., 6, 515-526, 2002. [Bibtex](#) [EndNote](#) [Reference Manager](#)



Search HESS

Library Search

Author Search

News

- New Service Charges
- Financial Support for Authors
- ISI Impact Factor: 2.270

Recent Papers

01 | HESSD, 17 Mar 2009:
A general real-time
formulation for multi-rate
mass transfer problems

02 | HESSD, 16 Mar 2009:
Calibration of a crop model
to irrigated water use using a
genetic algorithm

03 | HESSD, 16 Mar 2009:
A Bayesian approach to
estimate sensible and latent
heat over vegetation

04 | HESS, 13 Mar 2009:
Soil moisture retrieval
through a merging of multi-