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

Volumes and Issues | Contents of Issue 1

Hydrol. Earth Syst. Sci., 5, 27-38, 2001
www.hydrol-earth-syst-sci.net/5/27/2001/

Temporal disaggregation of satellite-derived monthly precipitation estimates and the resulting propagation of error in partitioning of water at the land surface

S.A. Margulis and D. Entekhabi
Ralph M. Parsons Laboratory, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, USA
email for corresponding author: margulis@MIT.edu

Abstract. Global estimates of precipitation can now be made using data from a combination of geosynchronous and low earth-orbit satellites. However, revisit patterns of polar-orbiting satellites and the need to sample mixed-clouds scenes from geosynchronous satellites leads to the coarsening of the temporal resolution to the monthly scale. There are prohibitive limitations to the applicability of monthly-scale aggregated precipitation estimates in many hydrological applications. The nonlinear and threshold dependencies of surface hydrological processes on precipitation may cause the hydrological response of the surface to vary considerably based on the intermittent temporal structure of the forcing. Therefore, to make the monthly satellite data useful for hydrological applications (i.e. water balance studies, rainfall-runoff modelling, etc.), it is necessary to disaggregate the monthly precipitation estimates into shorter time intervals so that they may be used in surface hydrology models. In this study, two simple statistical disaggregation schemes are developed for use with monthly precipitation estimates provided by satellites. The two techniques are shown to perform relatively well in introducing a reasonable temporal structure into the disaggregated time series. An ensemble of disaggregated realisations was routed through two land surface models of varying complexity so that the error propagation that takes place over the course of the month could be characterised. Results suggest that one of the proposed disaggregation schemes can be used in hydrological applications without introducing significant error.

Keywords: precipitation, temporal disaggregation, hydrological modelling, error propagation

Final Revised Paper (PDF, 181 KB)

Citation: Margulis, S.A. and Entekhabi, D.: Temporal disaggregation of satellite-derived monthly precipitation estimates and the resulting propagation of error in partitioning of water at the land surface, Hydrol. Earth Syst. Sci., 5, 27-38, 2001. Bibtex EndNote Reference Manager

Copernicus Publications
The Innovative Open Access Publisher

Search HESS
Library Search
Author Search

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

Recent Papers
01 | HESSD, 23 Mar 2009: Reducing the hydrological connectivity of gully systems through vegetation restoration: combined field experiment and numerical modelling approach

02 | HESSD, 20 Mar 2009: Linking hydropedology and ecosystem services: differential controls of surface field saturated hydraulic conductivity in a volcanic setting in central Mexico

03 | HESSD, 20 Mar 2009: Hydrological model