

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 2 ▣ Special Issue

Hydrol. Earth Syst. Sci., 5, 259-271, 2001  
www.hydrol-earth-syst-sci.net/5/259/2001/

© Author(s) 2001. This work is licensed  
under a Creative Commons License.

## Statistical atmospheric downscaling for rainfall estimation in Kyushu Island, Japan

C. Bertacchi Uvo<sup>1</sup>, J. Olsson<sup>2</sup>, O. Morita<sup>3</sup>, K. Jinno<sup>2</sup>, A. Kawamura<sup>2</sup>,  
K. Nishiyama<sup>2</sup>, N. Koreeda<sup>4</sup>, and T. Nakashima<sup>4</sup>

<sup>1</sup>Department of Water Resources Engineering, Lund University, Box 118, 221 00 Lund, Sweden.

<sup>2</sup>Institute of Environmental Systems (SUIKO), Kyushu University, 6-10-1 Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan.

<sup>3</sup>Department of Earth and Planetary Sciences, Faculty of Science, Kyushu University, 6-10-1 Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan

<sup>4</sup>CTI Engineering Co., Ltd., 2-4-12 Daimyo, Chuo-ku, Fukuoka 810-0041, Japan  
Email: Cintia.Uvo@tvr1.lth.se

**Abstract.** The present paper develops linear regression models based on singular value decomposition (SVD) with the aim of downscaling atmospheric variables statistically to estimate average rainfall in the Chikugo River Basin, Kyushu Island, southern Japan, on a 12-hour basis. Models were designed to take only significantly correlated areas into account in the downscaling procedure. By using particularly precipitable water in combination with wind speeds at 850 hPa, correlation coefficients between observed and estimated precipitation exceeding 0.8 were reached. The correlations exhibited a seasonal variation with higher values during autumn and winter than during spring and summer. The SVD analysis preceding the model development highlighted three important features of the rainfall regime in southern Japan: (1) the so-called Bai-u front which is responsible for the majority of summer rainfall, (2) the strong circulation pattern associated with autumn rainfall, and (3) the strong influence of orographic lifting creating a pronounced east-west gradient across Kyushu Island. Results confirm the feasibility of establishing meaningful statistical relationships between atmospheric state and basin rainfall even at time scales of less than one day.

**Keywords:** atmospheric downscaling, precipitation, rainfall, singular value decomposition, southern Japan

▣ [Final Revised Paper](#) (PDF, 469 KB)

Citation: Bertacchi Uvo, C., Olsson, J., Morita, O., Jinno, K., Kawamura, A., Nishiyama, K., Koreeda, N., and Nakashima, T.: Statistical atmospheric downscaling for rainfall estimation in Kyushu Island, Japan, Hydrol. Earth Syst. Sci., 5, 259-271, 2001. ▣ [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, 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 hydrogeology 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