## **Sixth International Conference on Precipitation:** Predictability of Rainfall at the Various Scales

# ABSTRACTS



June 29-July 1, 1998 Mauna Lani Bay, Hawaii



THE MAUNA LANI BAY Hotel and Bungalows • Hawaii

> 68-1400 Mauna Lani Drive Kohala Coast, HI 96743

#### Wednesday, July 1: SCALING AND STOCHASTIC PRECIPITATION MODELS

#### SESSION 5

8:30am - 9:00am <u>ORAL PRESENTATION</u> 5-1 SPATIAL VARIABILITY AND SCALE INVARIANCE IN

REGIONALIZATION OF HYDROLOGIC EXTREMES Gupta, V.

9:00am - 9:30am <u>ORAL PRESENTATION</u> 5-2 USWRP HYDROLOGY US WEATHER RESEARCH PROGRAM Smith, J.Dungan

9:30am - 10:15am

- 5-3 PREDICTION OF TEMPORAL RAINFALL FROM MULTIPLICATIVE CASCADE MODELS Carsteanu, A., .V Venugopal and E. Foufoula-Georgiou
- 5-4 A FIELD-THEORETICAL APPROACH TO MODEL ING RAINFALL STATISTICS FROM A DYNAMICAL POINT OF VIEW Nordstrom, K., V. Gupta and J. Rundle
- 5-5 HIERARCHICAL TIME-SCALE STRUCTURE IN DEPENDENCY OF RAINFALL DISTRIBUTION ON TOPOGRAPHY Nakakita, E., N. Okada and S. Ikebuchi
- 5-6 BEYOND MULTIFRACTAL PHENOMENOLOGY OF CLOUDS AND PRECIPITATION Schertzer, D., M. Larchevegue and S. Lovejoy
- 5-7 DATA INTENSIVE TEST OF THE UNIFORM SCALING MODEL OF THE ATMOSPHERE Lovejoy, S., J. Stanway, S. Pecknold and D. Schertzer
- 5-8 MULTIFRACTAL STUDY OF THE 3-D SPATIAL DISTRIBUTION OF RAIN AND SNOW PARTICLES Desaulniers-Soucy, N.,R. Nowak,S. Lovejoy and D. Schertzer
- 5-9 ESTIMATION OF PRECIPITATION STATISTICS OVER CATCHMENT ELEVATION BANDS UNDER CLIMATE CHANGE CONDITIONS Panagoulia, D. and G. Dimou

### Estimation of Precipitation Statistics over Catchment Elevation Bands under Climate Change Conditions

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A stochastic space-time model is developed to estimate the probability of daily precipitation occurrence and distribution of wet and dry period duration at three catchment elevation bands (upper, middle, lower) under climate change conditions. The mean and standard deviation of daily nonzero precipitation are also considered. The approach is based on a semi-empirical downscaling of simulated daily atmospheric circulation patterns (CPs) of General Circulation Models (GCMs). Three CP data sets are used: 40-year historical represented by the Meteorological Center (NMC) grid point analyses of the height of 500 hPa, 10-year  $1\times$ CO<sub>2</sub>, and  $2\times$ CO<sub>2</sub> scenarios obtained from the GCM of Max Blanck Institute. Nine CP types for the winter and summer half years are obtained to characterize large-scale climatic forcing in Mesochora catchment in Central Greece. Under the continental climate of Mesochora mountainous catchment the effect of  $2\times$ CO<sub>2</sub> scenario on elevation band precipitation regime is variable and significant: the probability of daily precipitation slightly increases, while significant changes are detected in the distributions of wet and dry period durations. Both the mean and variance of daily precipitation decrease significantly during the summer season.