Hydrol. Earth Syst. Sci. Discuss., 4, S168–S170, 2007
www.hydrol-earth-syst-sci-discuss.net/4/S168/2007/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Rainfall nowcasting by at site stochastic model P.R.A.I.S.E." *by* B. Sirangelo et al.

B. Sirangelo et al.

Received and published: 16 April 2007

We thank the referee for his comments on our paper. We consider the comments as very useful and below we provide the answers to the questions raised. Reply on the specific comments: 1. At the moment, PRAISE model is used in the warning system for the simulation and the forecast of landslide induced by rainfall, referred to Sarno area (Italy), affected by catastrophic mud-flows on May 1998. It is coupled with a R-L (Rainfall-Landslide) module, that correlates precipitation and landslide occurrence. PRAISE model can be also coupled with Rainfall-Runoff models. 2. PRAISE model provides the probability distribution of the variable to forecast, referred to the instants successive to the current time. Consequently, either mean values or any order percentiles are at once evaluated. This evaluation can be carried out in analytical way or using Monte Carlo techniques. 3. In Fig. 5 the shown percentile curves are referred to

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

EGU

predictions based on the knowledge of rainfall until the current time. It is obvious that the model is sensitive if there is an upgrade of the forecast by acquisition of recorded rainfall referred to successive instants. In other words, percentile curves will modify their behaviour depending on the new values of the variable Z. 4. Development of the PRAISE model, towards a stochastic forecasting conditioned to meteorological one (and therefore to the meteorological disturbance features), was already presented as PRAISE-ME model (B.Sirangelo, P.Versace, D.L.De Luca, Rainfall Nowcasting: Integrazione bayesiana di modelli stocastici e meteorologici, Proc. of XXX Convegno di Idraulica e Costruzioni Idrauliche, Roma, 10-15 September 2006). At the moment this work is submitted to an international hydrological journal. 5. Variable Z is representative of non-negative value variables H, referred to the antecedent hours, and therefore it must be non-negative too. If there were a negative alpha coefficient, variable Z could be negative and then not representative of antecedent rainfall. Alpha non-negative check is necessary because evaluation is carried out using an unconstrained analytical formulation. A different estimation technique, thrifty in the parameters number, constrained and numerical, is reported in: De Luca, D. L.: Metodi di previsione dei campi di pioggia. Tesi di Dottorato di Ricerca, Università della Calabria, Italy, 2005. 6. As regards the hypothesis of weak (i.e. second order) stationarity, it is not possible, because of the present hourly rainfall sample size, to identify a suitable typology of non-stationarity and then to carry out a parameter estimation with small uncertainty. For this reason, we use a stationary model, and his application is referred to the rainfall data measured during the “rainy season” 1 October - 31 May; in this period correlation structure, mean and variance of the sample appear significantly homogeneous (see De Luca, D. L.: Metodi di previsione dei campi di pioggia. Tesi di Dottorato di Ricerca, Università della Calabria, Italy, 2005). 7. Monte Carlo simulations are carried out according to standard procedures of every synthetic generation. Rainfall heights are generated using the probability distribution of H conditioned to the Z values. 8. PRAISE model provides an ensemble of input data for rainfall-runoff models and landslide induced by rainfall ones.

HESSD

4, S168–S170, 2007

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 151, 2007.