Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09790, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09790
EGU General Assembly 2008

Low flows regional pattern defined by catchment properties and climatic forcing

A. Longobardi (1), and P. Villani (1,2)

(1) Department of Civil Engineering, University of Salerno, Fisciano, Italy, (2) C.U.G.RI., Consorzio interUniversitario per la Prevenzione e Protezione Grandi Rischi, University of Salerno, Fisciano, Italy (alongobardi@unisa.it / Fax +39-089964099)

Low flow hydrological features are crucial for efficient development and integrated water resources management and a lot of effort has been made by the scientific community to deal with low flow parameters estimation in ungauged sites. From this point of view, statistical regional analysis is one of the most important tools. Among others, the BFI index, calculated as the long-term ratio of baseflow volume to total streamflow volume, is one of the most important low flow indexes. Many studies (Vogel and Kroll, 1990; Vogel and Kroll, 1992; Ponce and Shetty, 1995; Nathan et al., 1996; Lacey and Grayson, 1998; Haberlandt et al., 2001; Mwakalila et al., 2002) have demonstrated that it is related to a number of climatic and topographic parameters, to vegetation and soil types, besides catchment geology, but that the latter plays the role of the dominating variable. Unfortunately, variables describing geology features are hard to establish. For this reason, and also depending on available data quantity and quality, catchment geology, to be used for BFI prediction in ungauged basins, has been accounted for in different fashions. Frequently, soil classes systems, geology – vegetation groups, or combined hydrogeology and soil indexes have been used to this purpose (Gustard et al., 1989; Boorman et al., 1995; Lacey and Grayson, 1998). In a previous study Longobardi and Villani (2007) presented a low flows indexes statistical analysis based on the introduction of a permeability index, which summarizes geology, vegetation and soil type effect on the infiltration process, particularly suited for typical Mediterranean environment and also in a scarcity data context. In a simple regional linear regression approach, relating the BFI to the permeability index, as the independent variable, it

was found that the latter explains about the 70% of the variance. The introduction of other catchment properties did not significantly increase the model performance. The case study here presented is represented by 29 stations, ranging in area from 13 to 5500 km2, located within a region of about 20.000 kmq, in Southern Italy. In a cluster analysis it will be shown the effect of the combined use of the mentioned permeability index and of the climatic forcing, summarized in the mean annual precipitation, in describing regional patterns of hydrological extremes.