

Proposal of Tank Moisture Index to predict floods and droughts in Peixe River watershed, Brazil

ELFRIDE ANRAIN LINDNER¹ & MASATO KOBIYAMA²

¹ *Department of Civil Engineering, Santa Catarina Western University, Rua Getúlio Vargas 2125, Joaçaba-SC, CEP 89600-000, Brazil*
elfride@cardinal.com.br

² *Department of Sanitary and Environmental Engineering, Federal University of Santa Catarina, PO Box 476, Florianópolis-SC, CEP 88040-900, Brazil*

Abstract Peixe River watershed (5238 km²), in southern Brazil, has suffered from natural disasters caused by excess and shortage of rainfall. The mean values (1977–2004) of precipitation (P), potential evapotranspiration (ETP), real evapotranspiration (ETR) and discharge (Q) are 4.95, 2.95, 2.73 and 2.22 mm day⁻¹, respectively. The Tank Model with 4 vertical tanks and 12 parameters was validated for the whole period (Nash, 85% and Nash log, 85%). An index derived from the Tank Model, called the Tank Moisture Index (TMI), is created on a daily basis. It explores the water storage level in tanks 1–4, considering mean and median (md) values. TMI, range 0 to 10, was applied to analyse natural disasters events. The use of TMI_{md} gave a better adjustment than TMI_{mean}: 84% for floods in 161 decrees of water excess; 90% for droughts in 129 decrees of water shortage. TMI_{md} and Tank discharge had 97% correlation with the segmented regression.

Key words Tank Model; floods; droughts; Tank Moisture Index