

## **Investigation of urban-induced rainfall in Porto Alegre, Brazil, using TRMM satellite rainfall estimation**

**CESAR FENSTERSEIFER<sup>1</sup>, DANIEL ALLASIA<sup>1,2</sup>, JEAN FAVARETTO<sup>1</sup>, RAVIEL BASSO<sup>1</sup>, RUTINÉIA TASSI<sup>1,2</sup> & ANDRE L. SILVEIRA<sup>3</sup>**

*1 Programa de Pós-graduação em Engenharia Civil, Universidade Federal de Santa Maria, UFSM - Av. Roraima n° 1000 - Cidade Universitária - Bairro Camobi - Santa Maria - RS - CEP: 97105-900, Brazil  
[eng.cesar-augusto@hotmail.com](mailto:eng.cesar-augusto@hotmail.com)*

*2 Programa de Pós-graduação em Engenharia Ambiental, UFSM, Brazil*

*3 Instituto de Pesquisas Hidráulicas, Universidade Federal do Rio Grande do Sul*

**Abstract** Traditional rainfall networks have deficiencies in quantitative representation of rainfall over larger or complex areas without an extensive and expensive system, which is normally not available in developing countries such as Brazil. In the city of Porto Alegre, an experimental network of 14 raingauges showed large differences in rainfall throughout the city that were linked to Urban-Induced Rainfall (Silveira, 1997). Due to the lack of other raingauges in the region, TRMM satellite rainfall estimation has been explored to verify the observed patterns and evaluate impacts of spatial heterogeneity. The results have shown statistically significant differences in the maximum precipitation throughout the city, with differences in mean annual precipitation of 100 mm, and 20% differences in the maximum daily rainfall ever registered, confirming previous results, but have also shown regional patterns that converge in the city region. From the results, it is clear that TRMM data are a good complementary information source to traditional systems of measurement for assessing spatial variation in rainfall allowing extending information for ungauged areas of the city.

**Key words** rainfall; TRMM; urban area