



Using connectivity to assess soil erosion in the landscape; applications of a new paradigm in soil erosion modelling

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Hydrologic and sedimentological connectivity concepts recently appeared as novel paradigms (Bracken and Croke, 2007) and tools to assess soil erosion at various scales. The landscape flow connectivity index IC (Borselli et al. 2007, 2008) is based on the ratio of hydrological distance to streams with the potential upstream runoff occurrence, hence allows mapping surface runoff connectivity and erosion across the landscape. After its first introduction, several studies applied the IC algorithm in very different geographic regions and territorial scale: 150 km² watershed in Tuscany (Italy; Borselli et al. 2007, 2008); 20 small catchments (5 to 350 ha) in Murcia (Spain; Sougnez et al. 2011); 400 km² watershed in Basilicata (South Italy; Borselli et al. 2011); 3300 km² watershed in Victoria (Australia; Vigiak et al. 2012); 6 and 8 km² watersheds in the Italian Alps (Cavalli et al., in press); 74 ha catchment in Spanish Pre-Pyrenees (López-Vicente et al. 2013). Meanwhile, the IC index has been adapted for application to different erosion processes, i.e. hillslope erosion (Vigiak et al. 2012; López-Vicente et al. 2013), sediment remobilization by shallow landslides (Borselli et al. 2011), and debris flow (Cavalli et al. in press). Validation of IC index applications in spatially distributed erosion models has been conducted with field observations at hillslope scale, calibration against sediment yield estimates at several monitoring stations. These scientific results highlight the promising potential application of IC concept for erosion modelling. In this session, the IC model with all its proposed variants will be described. Future work perspectives, including potential developments of IC approach as an alternative method to classical soil erosion modelling, will be discussed.

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