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The young scientists network "Subsurface Stormflow" – Initial findings on investigation, modelling and validation

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Subsurface Stormflow is a well-recognized and important runoff generation process in mountainous catchments in humid climates. Generally subsurface stormflow develops in vertical structured soils where the bedrock or a less permeable soil layer is overlaid by a permeable soil layer and vertical percolating water is deflected more or less in a lateral direction due to the slope inclination. Subsurface stormflow is also known in the hydrological literature as shallow subsurface runoff, interflow, lateral flow or soil water flow which reflects the different underlying process concepts based on the experience developed in various experimental studies and modeling approaches in different environments at different spatial and temporal scales. Since the 1970s research studies to investigate the generation of subsurface stormflow have increased significantly. Although these studies resulted in countless publications subsurface stormflow is still a challenging runoff generation process in catchment hydrology. It is still unclear what factors are primarily controlling the temporal and spatial variability of subsurface stormflow and how this can be parametrized in rainfall-runoff models.

To fill this research gap the scientific network "Subsurface Stormflow – A well-recognized but still challenging process in catchment hydrology research" was be initiated to discuss current issues concerning the 1) detection of first-order controls of SSF, 2) the parameterization of subsurface stormflow in rainfall-runoff models and 3) the calibration and validation of the calculated subsurface stormflow. The network consists of Theresa Blume, Katja Maerker (former Heller), Luisa Hopp, Ilja van Meerveld, Thomas Graeff, Andreas Hartmann, Bernhard Kohl, Oliver Gronz, Edoardo Martini, Christian Reinhardt-Imjela, Martin Reiss, Michael Rinderer and Peter Chifflard. Together they critically reflect above-mentioned current issues and define research deficits as basis for a future research project.

The work program of the network is splitted in six workshops. Each workshop has a duration of about 3 days and organized as problem-solving moderated meetings regarding, where decisions are made in separate small groups and presented, discussed and documented in the entire joint group afterwards. The results of the discussion are formulated in hypotheses which will be the basis for the future project proposal. During the workshops the following topics will be discussed: 1) Subsurface Stormflow – Where? When? Why? 2) Detection of first-order controls. 3) Hydrological model concepts. 4) Calibration and validation approaches. The outstanding scientists Nicola Forer, Doerthe Tetzlaff, Axel Bronstert, Gunnar Lischeid, Taro Uchida, Jan Seibert and Markus Weiler will take part at the workshops and give essential contributions to the network by raising fundamental questions, leading specific discussions and escorting excursions. The six workshops will be organized at the institutes of the members (Universities of Marburg, Trier, Dresden, Tokyo (Japan), UFZ Leipzig and BfW Innsbruck) including field trips to experimental catchments where SSF generation is well investigated.