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Impact of wind direction and speed on the spatial distribution of soil loss on catchment scale

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This work reports on EROSION 3D simulations assessing the effects of wind speed and wind direction on soil erosion by water. These effects are based essentially on the fact that wind impact forces the rain drops to divert from their vertical fall direction. In order to simulate the effect of wind impact, an algorithm was implemented into the model, which describes the relation between wind speed and the diversion angle of the rain drops. This algorithm is based on measured data achieved by wind tunnel experiments performed by Gabriels et al. 1997. Referring to a small subcatchment located in the ore mountains of Saxony the impact of wind direction and wind speed was evaluated using the enhanced EROSION 3D model. As the simulated scenarios show erosion can be increased as well as decreased due to wind impact. The spatial distribution of soil loss and deposition obviously depends on the orientation of inclined field blocks towards wind direction with increased soil loss on blocks oriented windward and decreased soil loss on those oriented leeward. The effect of wind impact on soil erosion by water is substantial, and thus it should not be neglected in mathematical soil erosion models.