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Effect of persistent water cover on soil structure, investigated on representative Hungarian soil samples

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Today, due to climate change, soil degradation processes related to extreme water supply situations (flood, inland water or drought) are occurring more and more frequently. Soil structure is one of the most important soil characteristics influencing many transport of materials (transport, storage of heat, gas, water and nutrients).Furthermore, it defines and ultimately determines the significant physical, chemical and biological processes involved and also the most important factor in agricultural crop production. Permanent water cover has a significant effect on soil structure, but the dynamics of disaggregation and the role of the soil factors influencing it is not yet fully understood. Our basic research aim is to investigate the effect of permanent water cover on soil structure on representative Hungarian soil samples. In our experiment, we sought to find the answer to the question of how long-term water coverage causes changes and damage to the soil structure under laboratory conditions by artificial water cover. We measured aggregate stability with Mastersizer 3000 Hydro LV laser diffractometry device and some soil chemistry parameters with Agilent 4210 MP-AES at different water cover times (selected in the literature). Based on experiences the effect of persistent water cover from the soil structure side can be most noticeable in the changes of macro- and microaggregate stability, as well as in the change of certain chemical parameters (e.g. calcium and iron content), thus, the aim of our research was to investigate these characteristics also. After compiling our results in a database, we evaluated and deduced statistical data on the long-term degradation effects of water cover. We also made an attempt to describe its disaggregation dynamics for different Hungarian soil types. Based on the results, we have selected the most sensitive soils for permanent water cover, which are also expected to be sensitive to extreme water management related to climate change.