



Assessing naturalness of European floodplain hydromorphology using remote sensing products and other consistent large scale data

Lidija Globevnik, Sebastian Birk, Kathrin Januschke, Jochem Kail, Luka Snoj, Anne Lyche Solheim, Muhammet Azlak, and Trine Christiansen

TC VODE, Ljubljana, Slovenia (lidija.globevnik@guest.arnes.si)

The spatial reference framework is the lateral extent of the river channel and its floodplain, named “flood-prone area extent”. Due to human interventions into the hydrological cycle and morphological alterations of the river channel and its floodplain, some areas that were regularly flooded once, may not experience such flooding today. We characterize them as “former floodplains”. Floodplains flooded now are named “active floodplains”. The analysis is done on the spatial resolution level named “Functional Elementary Catchment” (FEC) of the European catchments and Rivers network system (Ecrins) database and for the flood-prone areas in Europe that include former and active floodplains with river channels. It is named “Potential flood prone area”. In the first step we defined floodplains typology. For the assessment part we developed indicators of floodplain forms and processes, defined their benchmark condition and performed quality classification. Here, we describe what spatial data we used and what data we still miss to produce reliable assessment.

The spatial layer “Potential flood-prone area extent” was derived from two spatial layers, Potential Riparian Zone Delineation of the Copernicus Land Monitoring Service and JRC flood hazard map for Europe 100-year return period, a result of flood model “LisFlood”.

The candidate list of typology factors included 31 factors derived from various databases such are Ecrins, MARS, FAO, Copernicus, WorldClim, PCGLOBEWB and IHME. Factors represent abiotic state before human intervention into rivers and floodplains and are grouped into regions, climate, morphology, hydrology, geology and physics – river dynamics. The calculated factors are reasonably covering the assessment area (95% - 99%) with the exception of the physics – river dynamics factors. This information was obtained for less than 30% of European area. The selection of factors defining floodplain types was based on the criterion of adequate spatial coverage, reliability and non-redundancy. As a result, floodplain types were derived from seven factors, three morphological (river average altitude and slope and average floodplain width), one geological (dominant catchment geo-chemistry) and three hydrological factors (specific runoff as mean annual discharge divided by catchment area, high flow duration and high flow pulses). Hydrological and morphological factors are only approximations to the natural state, so we propose to further develop databases providing information on river and floodplain

hydromorphology prior to major human interventions.

Indicators of floodplain forms are derived from two layers, Riparian Zone Land Cover/Land Use and High Resolution Water & Wetness of the Copernicus Land Monitoring Service. The land use layer provides a good basis for assessing the current distribution of floodplain habitats. We also estimate the size of the active natural floodplains using wetness data, but the results can be improved with systematic European wide information on present hydrotechnical structures and hydromorphological alterations. Such data would also support assessment of floodplain ecological condition and management options.