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The potential of LiDAR in recovering physical data on floodplain vegetation to parameterise flow resistance

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Much has been done with airborne scanning laser altimetry (LiDAR) to recover topographical data from a floodplain, while disregarding the vegetation altogether. Recently, LiDAR has proved also to be a very important new data source in aiding in the physical characterisation of floodplain vegetation for uses in parameterization in model friction. Vegetation data obtained from LiDAR has recently been used in two-dimensional models such as TELEMAC, but has categorized vegetation into short and flexible, and taller and inflexible. There is the need, therefore, to further classify floodplain vegetation into two and three-dimensional hydrologically significant factors. Hydrologically significant factors are those that influence the flow of water in terms of roughness and drag coefficients, velocity profiles, turbulence, diffusion, and so on. These factors can include height, canopy density, orientation, type (species), age and maturity, flexibility, and ground debris density. This paper will consider how LiDAR data may be used to define the vertical and horizontal structural properties of the vegetation cover (including the canopy height and density in the case of tree cover). It will also assess the way in which this information can be used to parameterise the flow resistance properties of floodplain vegetation. With a better understanding of the role of vegetation in fluid flow in the reach scale, the better the velocity and extent of the inundated water can be estimated on the catchment scale.