

## ***Interactive comment on “An index of floodplain surface complexity” by M. W. Scown et al.***

**Anonymous Referee #2**

Received and published: 31 May 2015

The present study focuses on the spatial complexity of floodplains combining surface topography and spatial organization of surface conditions. The relationship between different drivers (flow and sediment regime, floodplain width) and floodplain complexity was assessed in eight floodplains located in Australia, South Africa and the USA. The manuscript covers an important topic, namely the spatial complexity of floodplains and uses state-of-the-art techniques and methods to assess this complexity. The manuscript falls, however, short in putting the manuscript into a more general framework, and to justify the selection of the respective scales (e.g. in relation to floodplain area and corresponding ecosystem function and biodiversity).

Complexity for what? This question needs to be answered in a convincing way.

Methods. There need to be a better description of the methods applied (e.g. as supporting online information). For example, much more information on the selected flood-

C1872

plains is required (see Table 1). How is the downstream gradient been considered (topography corrected for slope)? It is not sufficient to refer to the doctoral thesis for more details on the methods. Multiple regression and more advanced methods should be considered to quantify the relationship between environmental variables and floodplain complexity.

Scale/resolution must be adjusted to the size of the floodplain. It requires a convincing justification why the same spatial resolution is selected despite obvious differences in floodplain area. The decline in complexity with floodplain width might be a consequence of inappropriate scale as well as with geomorphic style.

The result section can be substantially shortened by avoiding redundancies among text, tables, and figures.

To my understanding, floodplain width is overstated as the key “top-down” controlling factor of floodplain complexity. A much more critical discussion is required that underpins the underlying processes. Floodplain style, floodplain width, human impacts, vegetation effects, and hydrogeomorphic processes interact in creating complexity.

Vegetation plays a key role in creating topographic complexity (e.g. Gurnell et al. 2005. FEE). This aspect needs to be sufficiently considered in the discussion of the ms. Topography is a result of a complex feedback of fluvial-morphological and ecological processes, and controls ecosystem processes and biodiversity. To which extent does topographic complexity interact with hydrological complexity (connectivity, inundation patterns, etc.).

Furthermore, a critical discussion of the two complexity indicators compared to well-established landscape indicators (e.g. patch size, diversity, contrast, connectivity, etc) is required. Indeed, the present study needs to be better put into a landscape context. E.g. the meta-ecosystem concept focuses on habitat complexity by considering the composition, configuration, and connectivity of ecosystem entities. To which extent does the present approach differ from a meta-ecosystem approach?

C1873

C1874