Finding Patterns in the Landscape

Many spatial models work on grids of pixels, wherein every pixel has a specific value associated with it for every model input. For locations where a lot of information is available, the number of pixels can quickly grow quite large. This directly affects the complexity of the modelling task and, of course, the amount of computing time and power needed to calculate model results.

In order to deter the rising complexity problem (to both save time in computation and improve ARIES' ability to run on more widely accessible hardware), the landscape is first analyzed at the pixel level to find similarities in the values of neighboring cells. The overall spatial region is then partitioned into a number of subregions wherein the variance between these values is kept within a reasonable range which still preserves high visibility of the service's provision and usage. (See "Scale" for more on this)

Each subregion, or district, is then assigned the statistical distribution of all of its pixels' values, which are later used to set evidence for the likely state of the world in ARIES' probabilistic ecosystem service models. This statistical pattern driven approach significantly reduces the computational complexity of the models, while simultaneously translating the deterministic data measurements into a probabilistic context, allowing the models to more effectively express uncertainty and run in conditions of data scarcity.