

Self-organizing maps (SOM)

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Programme for Sustainable Growth and Jobs

Leverage from
the EU
2014–2020

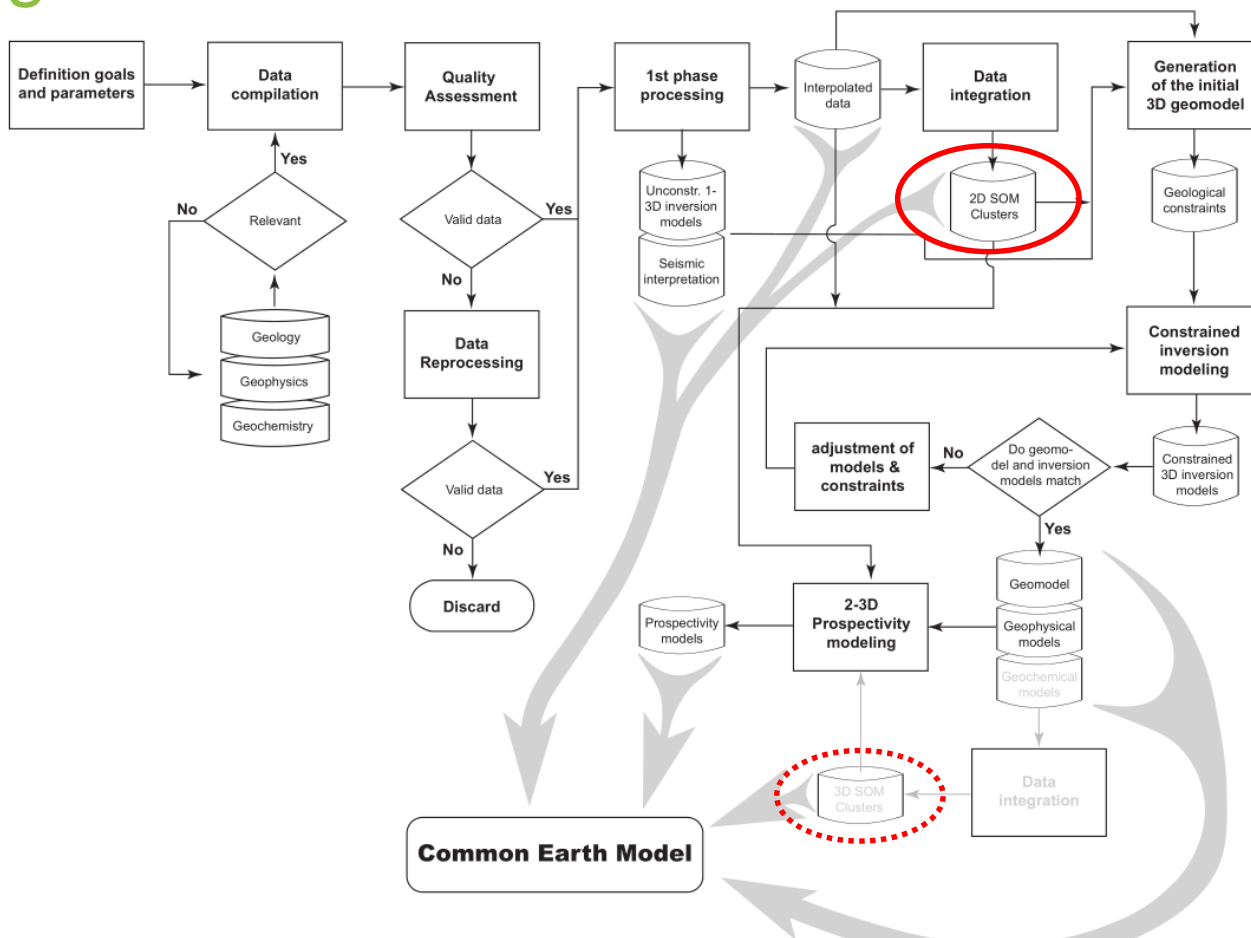


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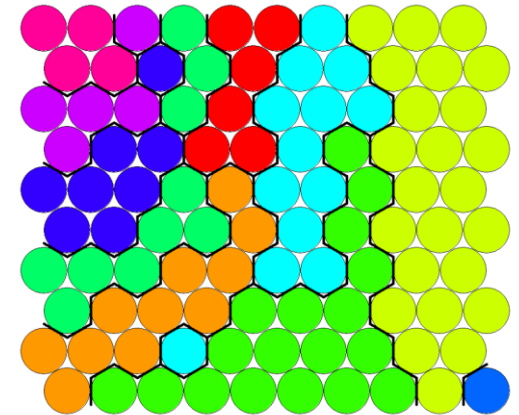
- What is SOM?
- SOM process used in the project
- Results and discussion

Background

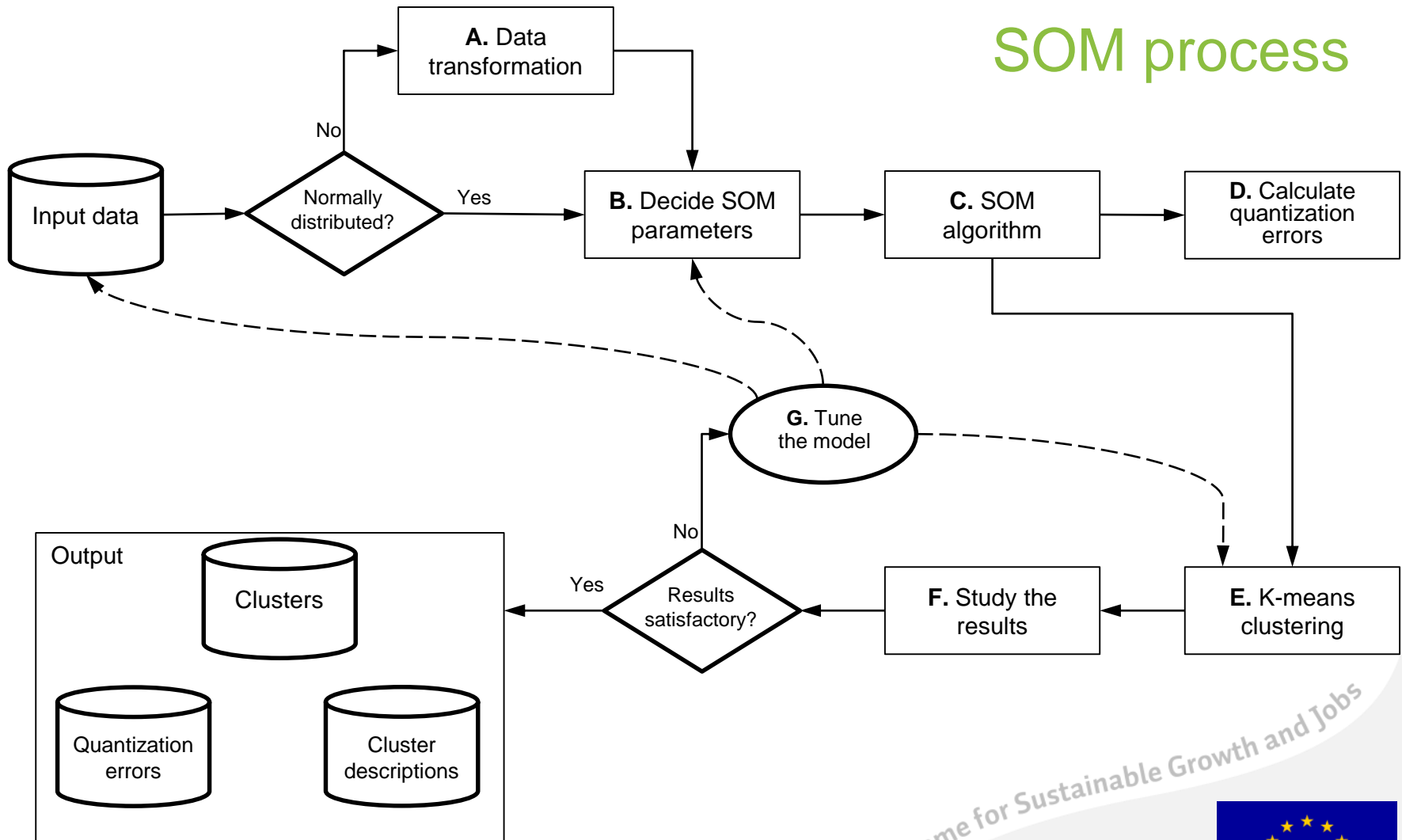


What is SOM

- Simple explanation: SOM is a method that organizes multidimensional data and it can be used to visualize the attributes
- SOM is an Artificial Neural Network
- It maps the input data to a 2D lattice of cells
 - Each cell has the same attributes as the original data
- Topology preserving nature: Similar data points will be mapped closeby in SOM
 - SOM can also be used for clustering; usually combined with K-means



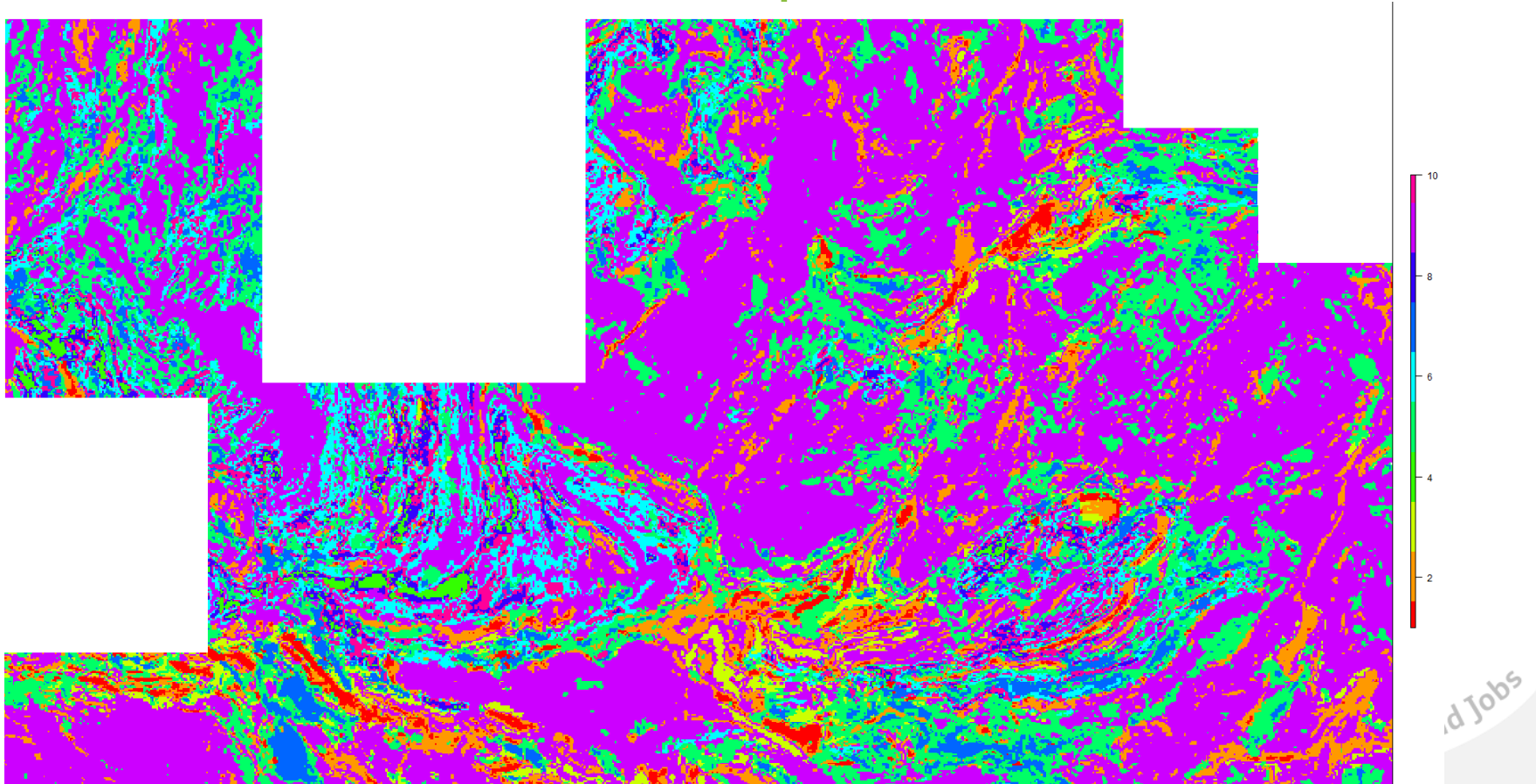
SOM process



Input data

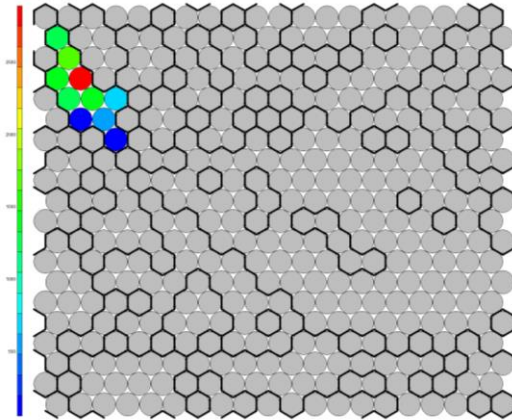
- 4 geophysical data sets were used:
 - In-phase component of airborne electromagnetic data (AEM in-phase)
 - Quadrature component of airborne electromagnetic data (AEM quadrature)
 - Airborne magnetic data (TMI)
 - Residual Bouguer anomaly of the regional gravity data (gravity)

Results: Clusters on a map

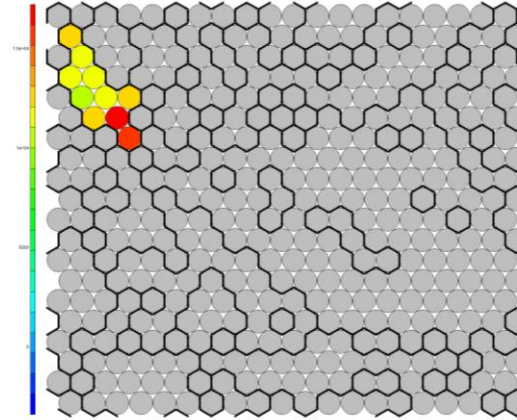


Results: Attribute visualization for each cluster

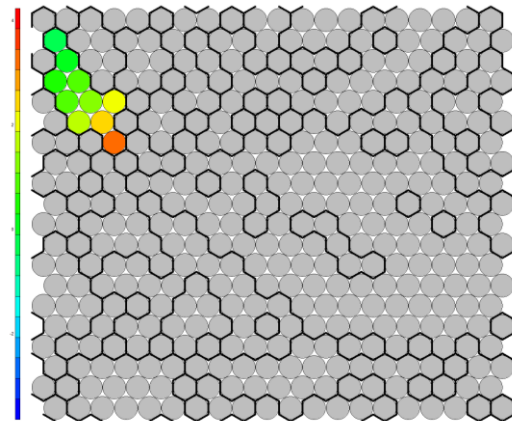
a) AEM quadrature



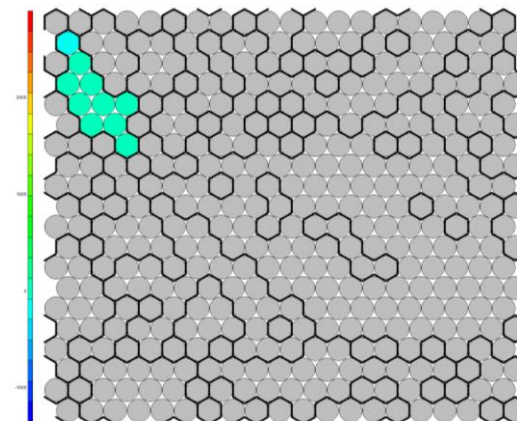
b) AEM in-phase



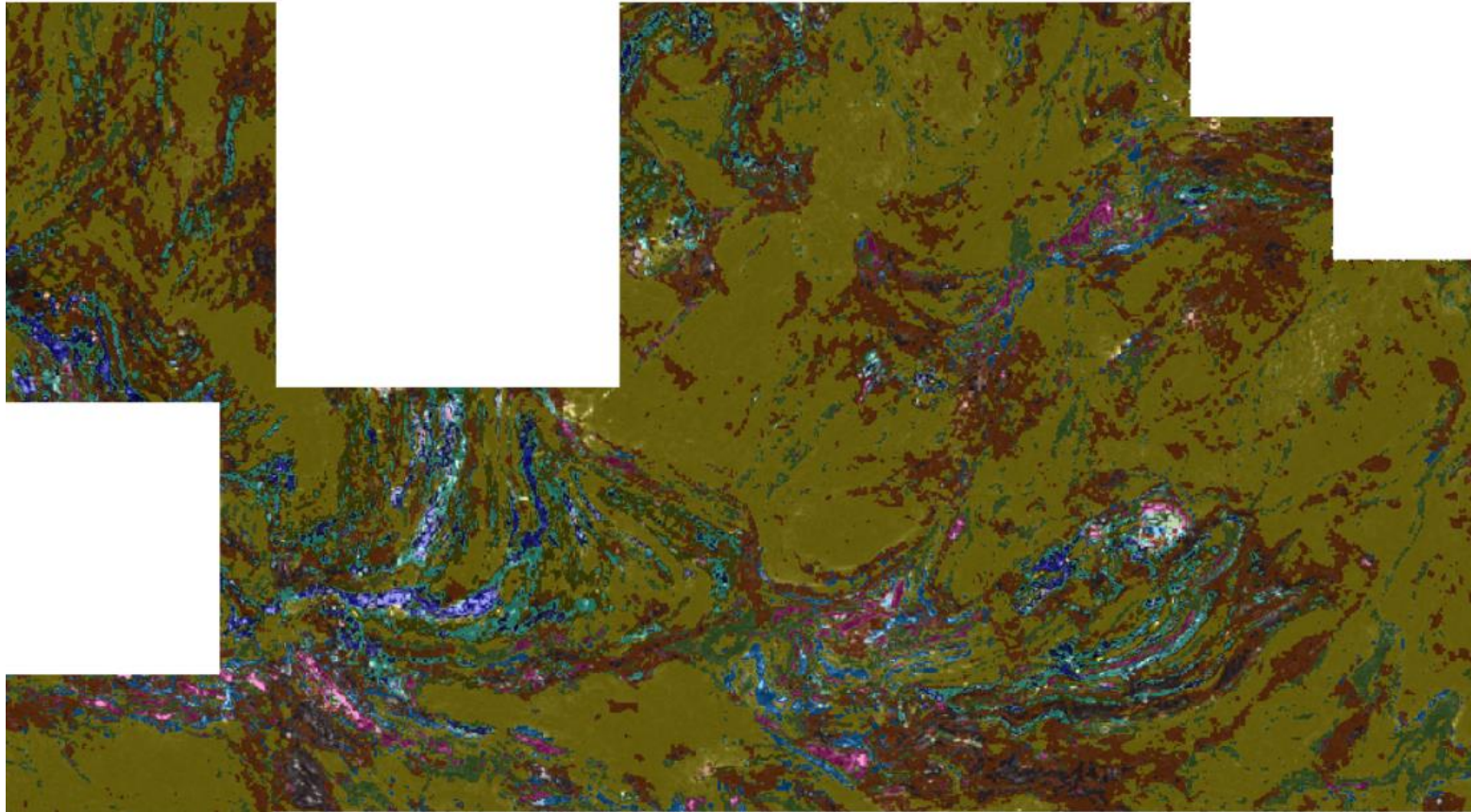
c) gravity



d) TMI

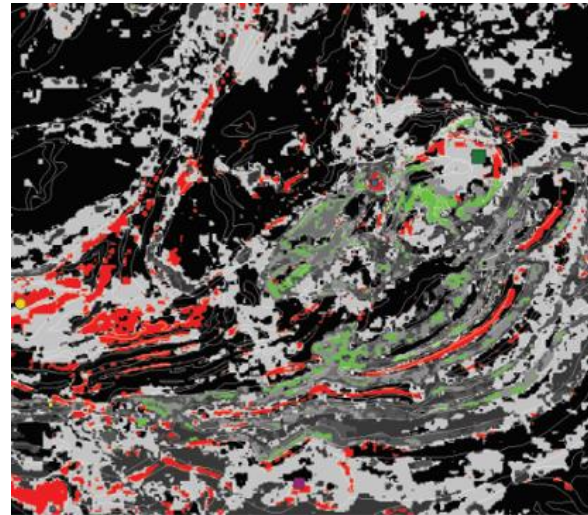
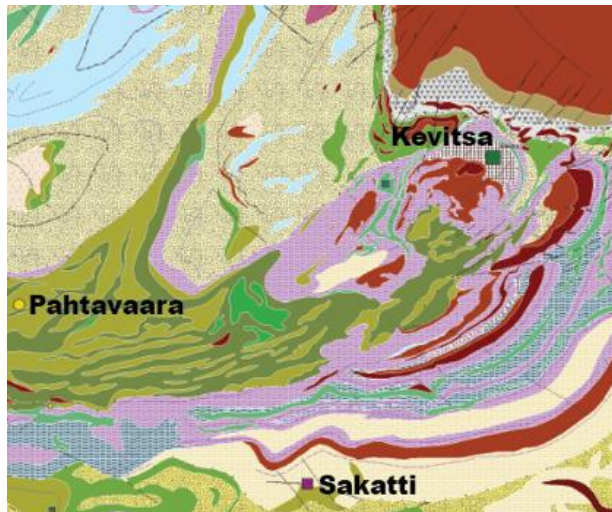


Results: Quantization errors on a map



Some notes and discussion

- The SOM process is iterative
- The map of clusters correlates with digital bedrock map



- 3D SOM clustering can use the same process

Thank You!



Project web pages: <http://projects.gtk.fi/XL3D>



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