

**IP\_Classification2D**

**Surface properties or seismic waveform  
classification using Kohonen SOM**

**User Manual**

**IPLAB LLC**

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## 1. Introduction

The **SOM\_Classtering** IP\_Seis plug-in (version: 2019.1.0.0, release date: August 2016) can be used for unsupervising classification via set of surface attributes and based on Kohonen SOM.

To do the classification there are two main calculation studies:

1. Training stage – to define centers of classes.
2. Calculation stage – to define class number for every node on surface according distance to nearest class center.

If the option of Kohonen SOM 1D classification is applied, SOM (self-organized mapping) is performed the mapping from multivariate space into 1D space. The result will be in the form of one index classes.

If the option of Kohonen SOM 2D classifications is applied, SOM (self-organized mapping) is performed the mapping from multivariate space into 2D space. The result will be in the form of two index classes.

If the option of Kohonen SOM 3D classification is applied, SOM (self-organized mapping) is performed the mapping from multivariate space into 3D space. The result will be in the form of three index classes.

## 2. Start

**Start:** Surface Attributes->

**SOM\_Classterng**

### 3. Input parameters

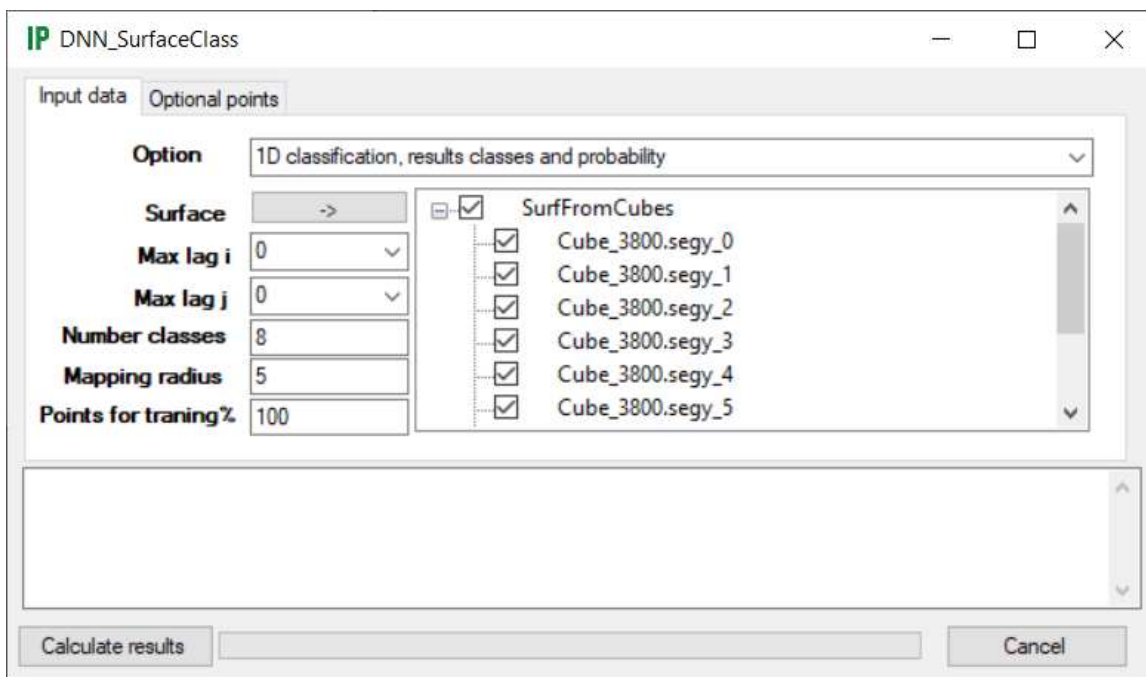


Figure 2: Input surface attributes data tab dialog view **SOM\_Clustering**

Parameters have to be defined before calculation:

**Option Algorithms:** allow to select from three types of algorithms

Kohonen neural network 1D

- one index classes **Number classes**

Kohonen neural network 2D

- two indexes classes **Number classes x Number classes**

Kohonen neural network 3D

- three indexes classes **Number classes x Number classes x Number classes**

**Surface:** allow to select a surface with a set of surface attributes from the project tree. All marked attributes will be used for calculations.

**Moving window radius i, Moving window radius j:** allow to define a moving window size around the production points in the course of training stage and around a node to make calculations in the course of calculation stage.

**Number classes:** defined number of classes.

**Mapping radius:** defined Kohonen mapping parameter. If **Mapping radius**= 0 using K-Mean algorithm for classification. If **Mapping radius** > 1 then nearest classes will be similar according Kohonen SOM algorithm.

***Percentage of Surface nodes for learning:*** to define a percentage of surface nodes to randomly use for learning. It allows to speed up calculations for a very big dataset and to perform testing variants. Recommended value is 100%.

## 4. Results

Classification result will be added like additional surface attribute with name **Class#**, where Number of classes. It can be visualized in Map window. Also will be added probability (distance to the cluster) attributes for every class with name **Prob#**.

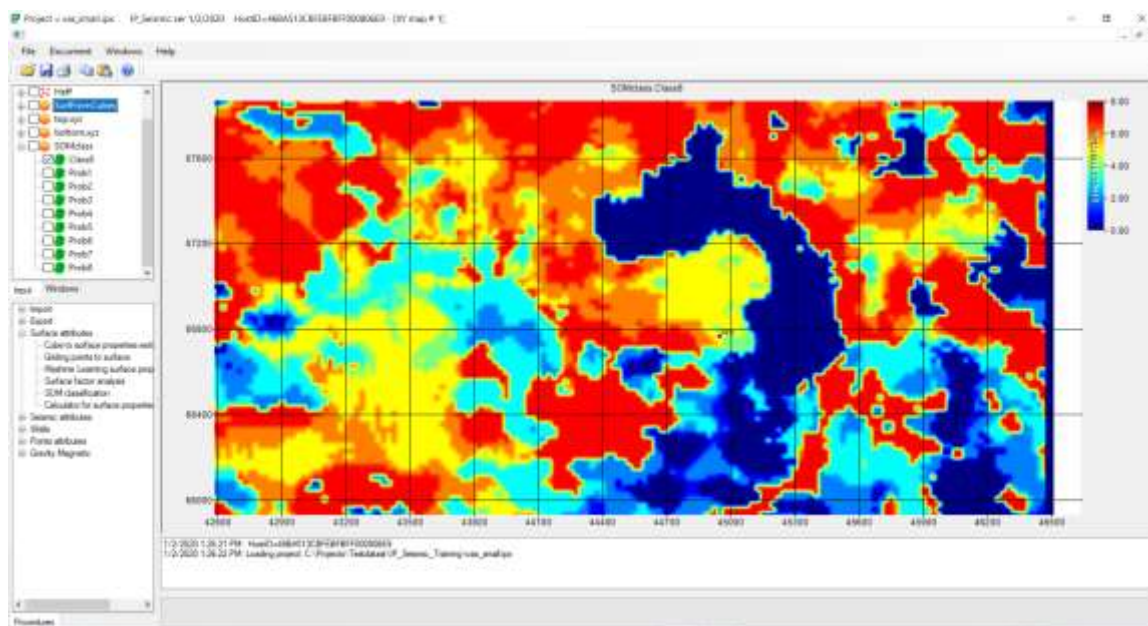


Figure 1. Result of SOM classification



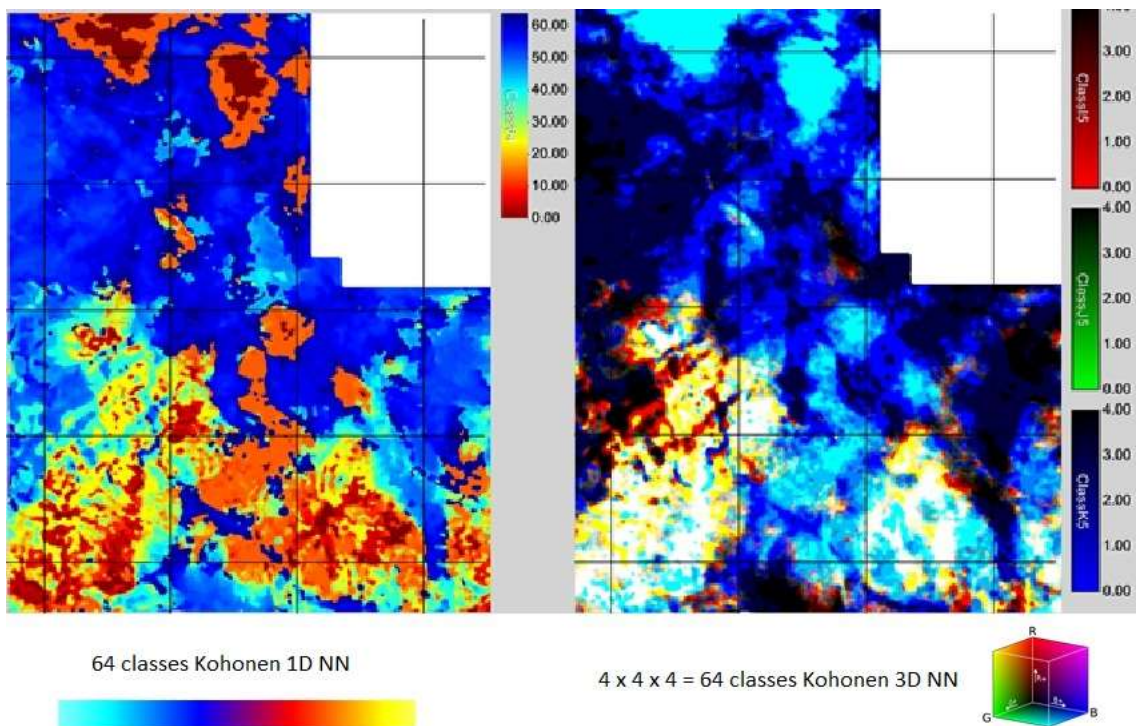


Figure 2. Comparison of 1D and 3D classification.

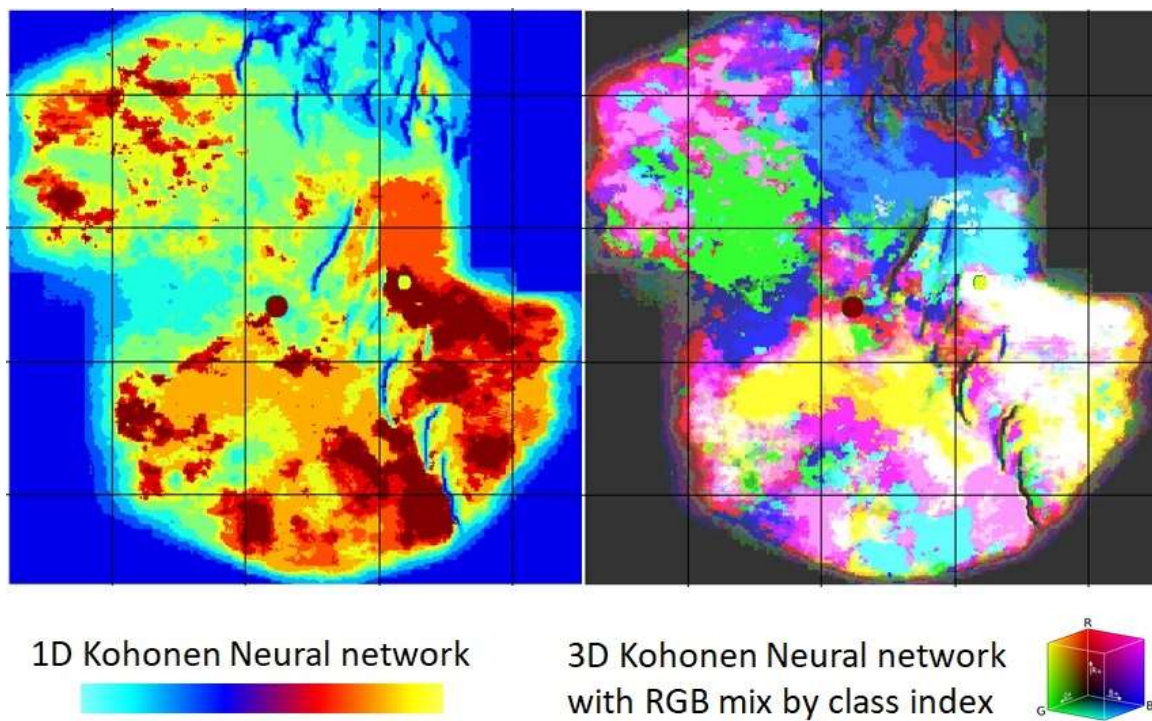


Figure 3. Comparison of 1D and 3D classification.