Object-based Land Use Change Mapping from multi-temporal Earth Observation Data in the Siberian Kulundasteppe

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Background

- Kulundasteppe in the Altai Krai is one of the most important granaries of the Russian Federation
- In the Altai region 2.3 Mio hectares were cultivated into crops during the “Zelina action” in the 1950s (Meinel 2002)
- Several years later soil degradation and yield loss were discovered, caused by inadequate land management and insufficient crop growing strategies (Meinel 2002)
- Goal of the German-Russian Research Project Kulunda – How to prevent the next “Global Dust Bowl”? is to develop strategies to minimize soil degradation while concurrently increase or assure agricultural yields
- One specific goal of our sub project is to quantify the land use change using multi temporal Earth Observation data

Features for classification:

- Brightness, Standard deviation of brightness, Normalized Difference Water Index (NDWI), Normalized Difference Vegetation Index (NDVI), Values of visible normalized channels (blue, green, red), Vegetation Soil Salinity Index (VSSI), Standard deviation of NIR and MIR-Channel, Green NDVI, Red/Blue, Greenness, Sum of all visible channels
- Form features: Rectangular Fit, Border Index, Length/Width-Ratio

Data & Methods

- RapidEye, 1999 Landsat 7 ETM+, 2012
- Landsat 2 MSS, 1974
- Corona KH4B, 1999
- HPF data fusion

Poluyamkij – dry steppe
- Typical steppe
- Forest steppe

Change 1974 - 2012

Method: Post-classification comparison
- Advantage: detailed change matrix, change of specific classes
- Disadvantage: error propagation from classification

Overall accuracy: 78%

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Literatur:


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