SCERIN 5 – Pecs, Hungary, 2017
Posters speed talks
(2 minutes highlights)

FG3: Validation/Verification and Automation

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Global Land Cover Products Validation and Inter-Comparison in South Central and Eastern Europe (SCERIN)

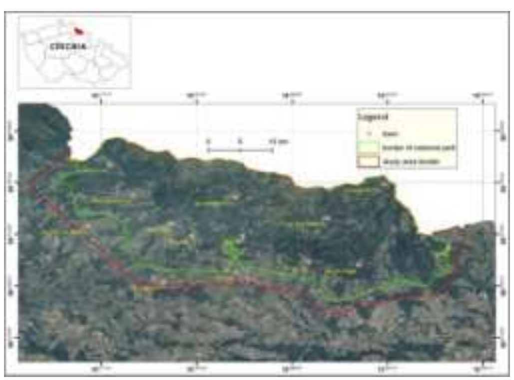
Prototype Objectives:

- To develop prototypes of the validation products, and provide preliminary findings using case studies from Greece and Czechia.
- To compare results from Giant Mountains, Czechia with results from Thessaly, Greece.
- To assess the specifics of land cover in study areas in terms of land cover classification and its validation.
- The effort is an initiative of the SCERIN.

Presented:

World Cover 2017, ESA, Frascati, March

2017 US-IALE, Baltimore, Maryland, April 9-13



Validated Maps: Global LC maps (GLC) : 1) the Copernicus CORINE Land Cover 2012 (CLC) - ETRS89 / ETRS-LAEA CRS; and 2) the GlobeLand30 (GL_30) 2010 raster files (30m) - WGS 84 / TMzn34-35N

Conclusions: **Very similar, rather good, accuracies were reached for both study areas and for both CORINE 2012 and GLOBALAND30 products. Slightly better accuracy (4%) for CORINE in Greece and almost the same accuracies for both products in Czechia.**

Modelling land surface phenology and seasonality in highland pastures in the Kyrgyzstan

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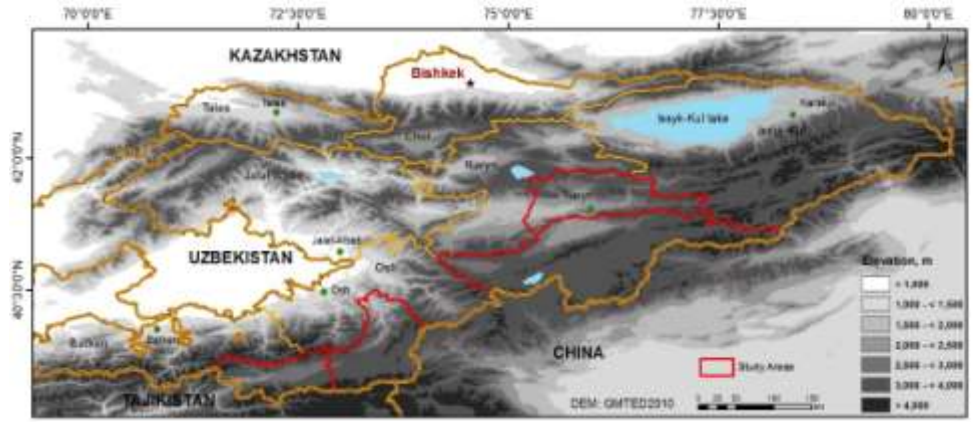
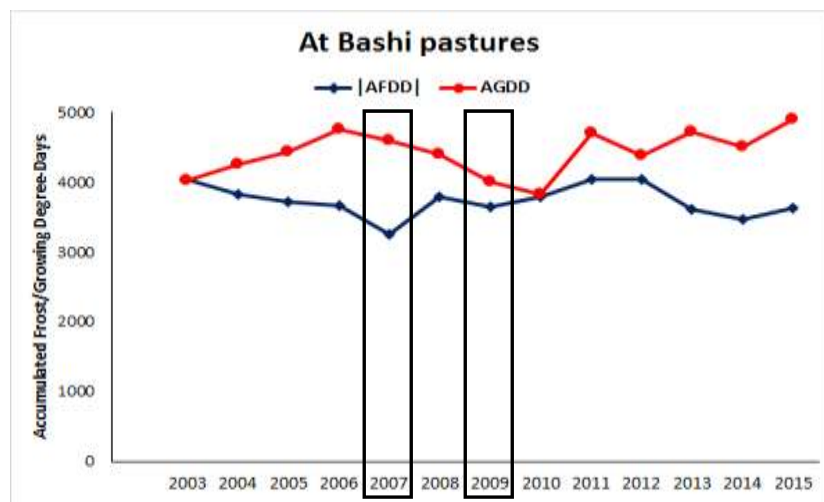
- In the highlands of Kyrgyzstan, vertical transhumance is the foundation of montane agropastoralism. Terrain attributes is a key influence on the timing of plant growth and forage availability.

- the linkages between snow cover seasonality and land surface phenology as modulated by terrain and variations in thermal time based on SRTM DEM at 30 m and 16 years (2001-2016) of Landsat 5 TM, 7 ETM+ & 8 OLI MODIS (LST) and snow cover products at 1 km and 500 m, respectively.

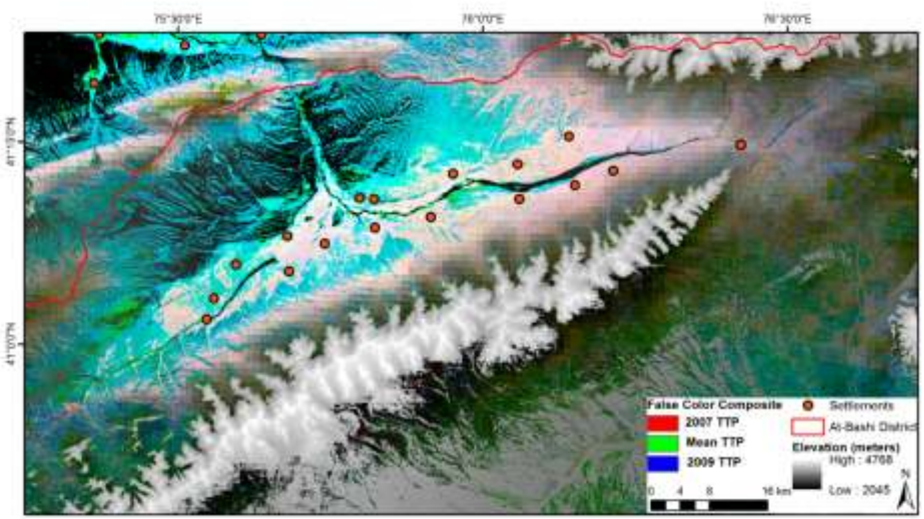
- the land surface phenology as a quadratic function to link the Normalized Difference Vegetation Index (**NDVI**) from Landsat 5 TM, 7 ETM+ & 8 OLI with accumulated growing degree-days (**AGDD**) calculated from MODIS LST data and fitted on pixel time-series.
- the land surface seasonality: Normalized Difference Snow Index (**NDSI**) and accumulated frost degree-days (**AFDD**) from MODIS LST:



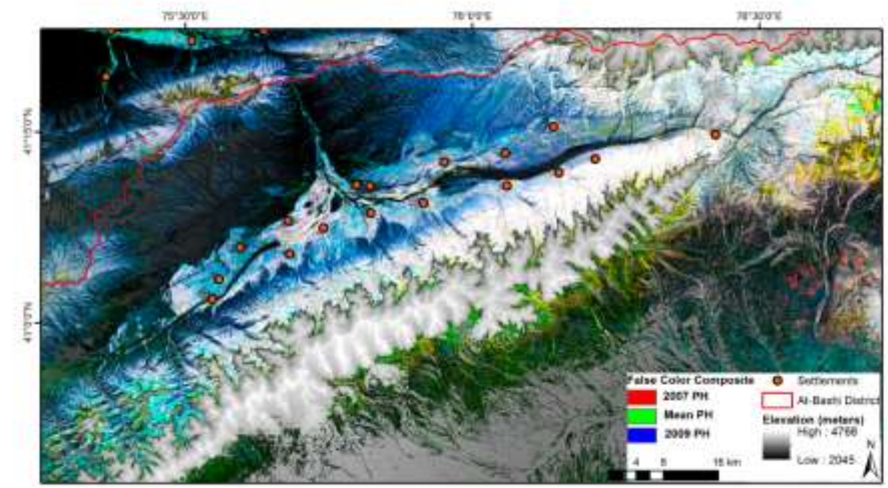
Changes in thermal and moisture regimes 2003 – 2015

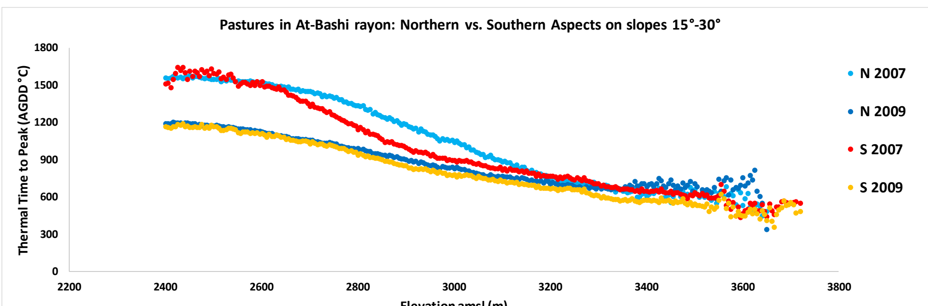


Thermal Time to Peak (TTP) phenometric map (1 km)

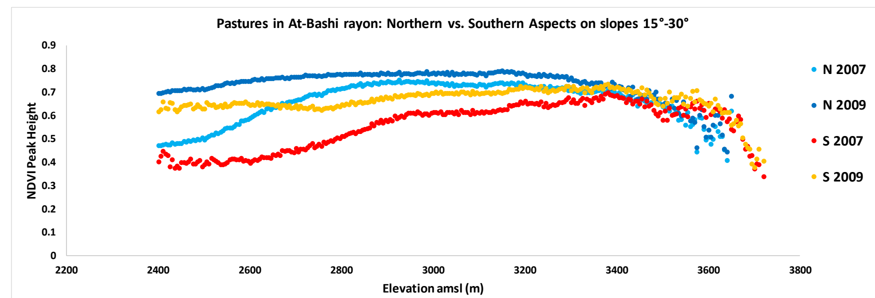


Peak Height (PH) phenometric map (30 m)





Aspect has a negligible effect on PLRs in cool, wet years



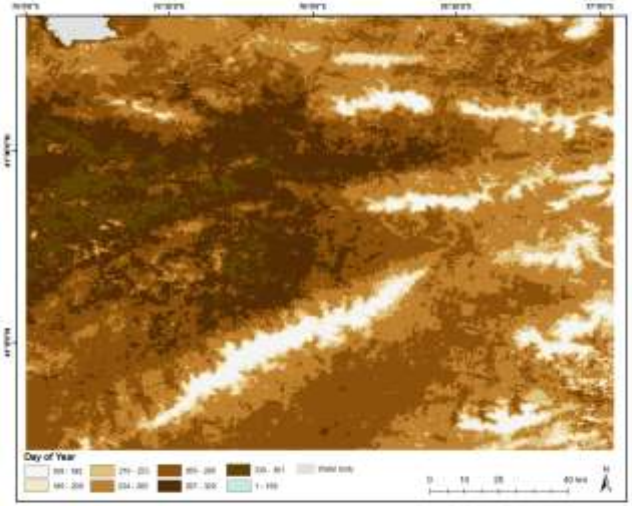
Increasing PH with elevation is absent in wetter year of 2009

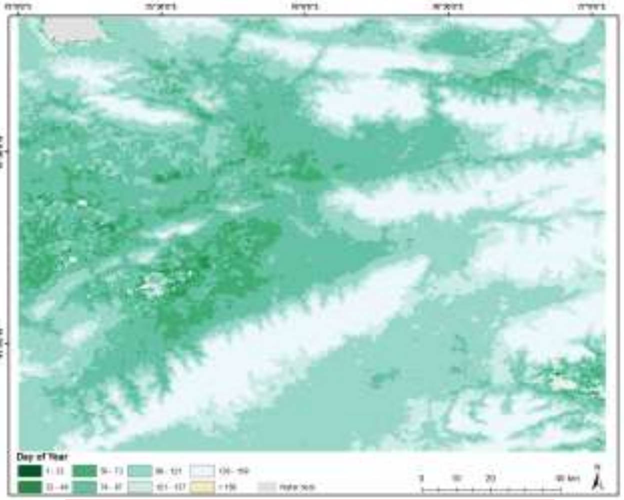
$$\mathbf{NDVI = \alpha + \beta AGDD - \gamma AGDD^2 \;||\; NDSI = \alpha + \beta AFDD - \gamma AFDD}$$

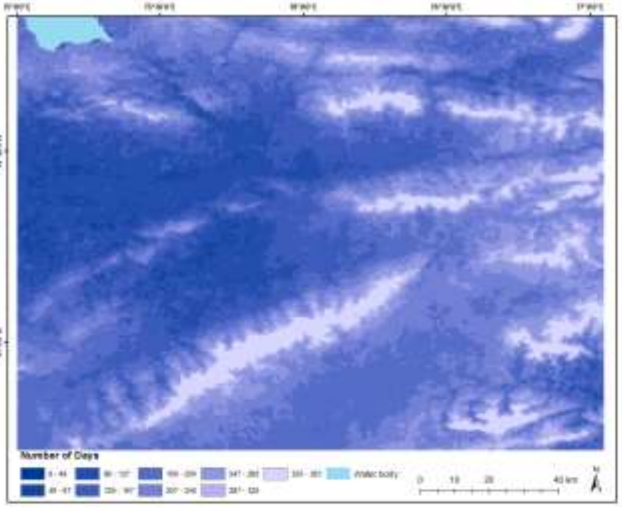
Model phenometrics include the Peak Height (PH): $PH = \alpha - (\beta^2/4\gamma)$

and the Thermal Time to Peak (TTP): $TTP = -\beta/2\gamma$

which can be mapped across the landscape to explore interactions between climatic variation and terrain attributes (elevation, slope, aspect).







mean first day of snow:

1. negative relation to elevation
2. positive relation to TTP
3. constrained negative relation to PH

mean last day of snow:

1. positive relation to elevation
2. negative relation to TTP
3. constrained positive relation to PH

mean duration of snow:

1. positive relation to elevation
2. negative relation to TTP
3. constrained positive relation to PH

Comments

- Phenometric Lapse Rates found in At-Bashy rayon are representative of PLRs found in Naryn, Alay, and Chong-Alay rayons.
- Growing season weather affects PLRs: hotter drier conditions increase change; cooler moister conditions decrease change.
- Soil moisture is critical for forage production in these highland pastures, so we focus on the seasonal dynamics of snow.

Next Steps

(1) Implement annual analyses for land surface phenology and snow seasonality and evaluate interannual variation & trends; (2) Explore linkages between the cold equivalent of AGDD and snow sensitive spectral indices (NDSI & NDII) (3) Link snow seasonality to land surface phenology as modulated by terrain attributes and interactions.; (4) Assess influence of different DEMs (SRTM vs. ASTER) on PLRs.

Automatic object based LCLUC generation from high resolution satellite data

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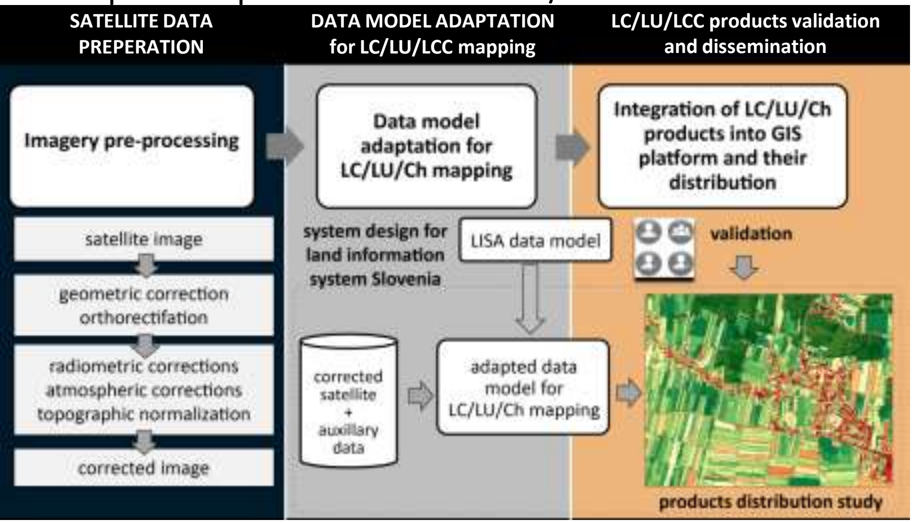
VHR satellite data based Land Information System Slovenia (LISS) development with automatic classification and update capabilities to facilitate different applications

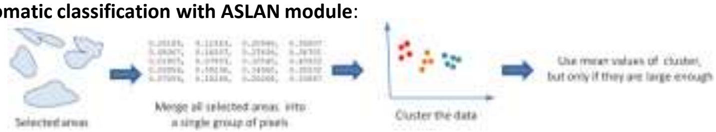
Selected case: crop identification and crop stress monitoring with Sentinel 2 data

LISS development with automatic classification and update capabilities based on V/HR satellite data



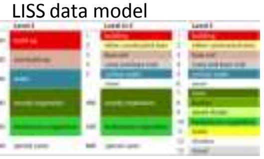
LISS data model for **automatic classification with ASLAN module**:

Trainning samples based on list of conditions



Automatic **classification** with ASLAN module (neural network or other classifiers)

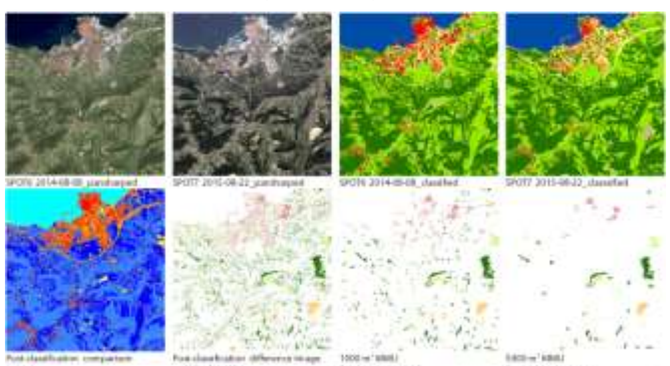
LISS data model



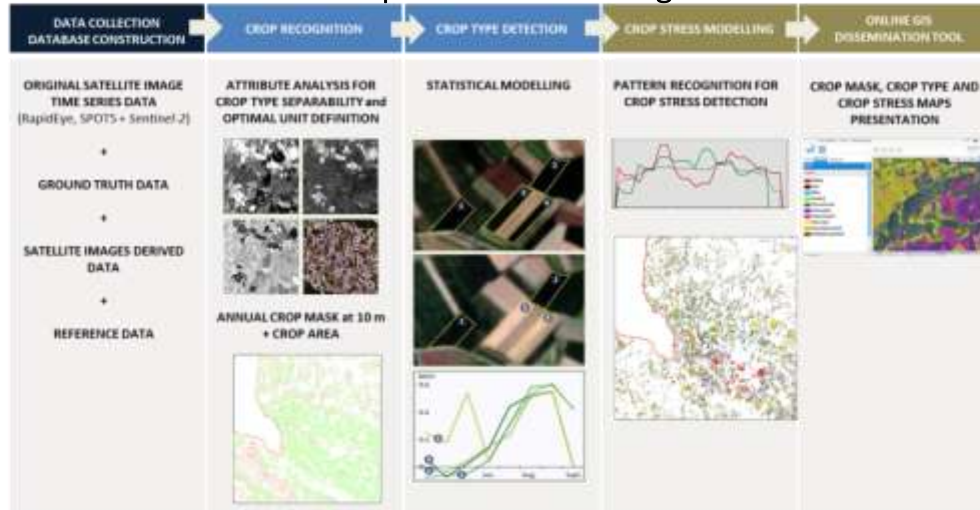
Change detection and land cover update capabilities:

CD: image differencing vs. Post-classification comp.

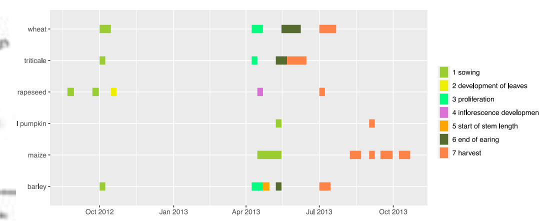
Post-classification based change modelling:



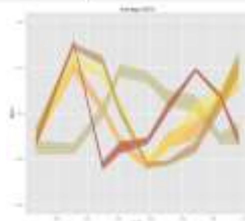
Sentinel-2 time series data for crop identification and crop stress monitoring



Crop calendar for main crops growing in the study area:

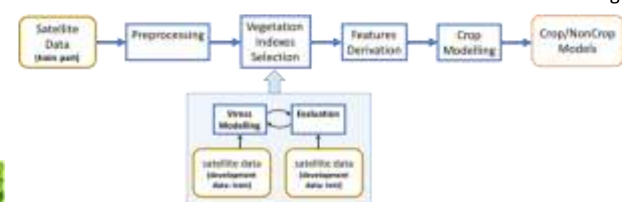


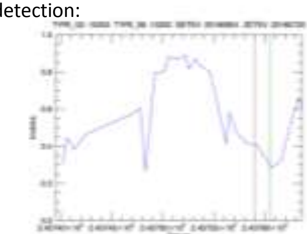
Seasonal behaviour of crops:



Estimating harvesting time from a S2 NDVI annual profile, 10 day temporal resolution. Two cases of harvesting date detection:

Procedure for crop modelling:





Crop mapping: reference map, crop classification map and map of crop type clasification error: