# LST retrieval using the synergy of S3-OLCI and SLSTR

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## Main objective

Land surface temperature (LST) is one of the key parameters in the physics of land-surface processes on regional and global scales, combining the results of all surface-atmosphere interactions and energy fluxes.

In this exercise we will explore the synergistic use of OLCI/SLSTR instruments on board Sentinel-3 platform to retrieve LST products using the Sentinel-3 Tool Box implemented in SNAP. For this purpose, the high spatial resolution data from OLCI will be used for a good characterization of the land surface sub-pixel heterogeneity, in particular for a precise parameterization of surface emissivity using the normalized difference vegetation index (NDVI) threshold method (THM) by Sobrino et al., 2008. Effective emissivity and water vapour extractions will allow accurate LST retrievals using the SLSTR thermal bands by developing a synergistic split-window algorithm (Sobrino et al., 2016).

Methodology on validation of the results using simulated ground data will also be explained in the exercise,. We will as well take a glance on the tools for batch processing included in SNAP.

## Material

- OLCI and SLSTR scenes on the same area taken the same day. The study area will be in Hungary.

- SNAP and the S3TBX.

- Excel

### Processing chain

1. OLCI radiance to reflectance conversion
2. Collocate OLCI-L1+ OLCI L2
3. Emissivity calculation based on NDVI /OGVI thresholds method→using band math
4. Water vapour band selection
5. Collocate SLSTR (master) / OLCI (slave) → 1000 m
6. Apply the LST split window algorithm with the band math tool only on valid pixels → definition of "valid pixel" using masks and flags of the products.
7. Validate with simulated in situ data: match-up selection, correlative plots, pixel information extraction
8. Comparison with S3 LST standard product using the pixel extraction tool
9. Batch processing: how to apply the processing chain to a bunch of products

### References

1. J. A. Sobrino *et al*., "Land Surface Emissivity Retrieval From Different VNIR and TIR Sensors," in *IEEE Transactions on Geoscience and Remote Sensing*, vol. 46, no. 2, pp. 316-327, Feb. 2008.doi: 10.1109/TGRS.2007.904834
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2. J.A. Sobrino, J.C. Jiménez-Muñoz, G. Sòria, A.B. Ruescas, O. Danne, C. Brockmann, D. Ghent, J. Remedios, P. North, C. Merchant, M. Berger, P.P. Mathieu, F.-M. Göttsche, Synergistic use of MERIS and AATSR as a proxy for estimating Land Surface Temperature from Sentinel-3 data, Remote Sensing of Environment, Volume 179, 2016, Pages 149-161, ISSN 0034-4257, http://dx.doi.org/10.1016/j.rse.2016.03.035 (http://www.sciencedirect.com/science/article/pii/S0034425716301158)