GENERATION OF HIGH SPATIOTEMPORAL LAND SURFACE TEMPERATURE TIME SERIES

Enhancing the Spatial Resolution of Geostationary LST Data

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INTRODUCTION

- LST is an important parameter of Land Surface Processes and a key input to many environmental applications.
- Presently, LST data are retrieved from Satellite Thermal Remote Sensing.
- Due to the anti-correlation between the spatial and temporal resolution, TIR satellite sensors cannot offer LST data that match the characteristic scale of the LST diurnal cycle.
- The statistical downscaling of geostationary TIR data is an effective technic to generate LST datasets that combine high spatial and temporal resolution.

High Spatiotemporal LST data are valuable for the study of the Hydrological Cycle and the Urban Thermal Environment.

SATELLITE DATA

In my research I use LST data from MSG-SEVIRI. MSG-SEVIRI is a geostationary weather satellite operated by EUMETSAT.

It acquires data in 12 spectral bands every 5-15 min (5 min in KSS mode) with a spatial resolution of 3.5 km.

PUBLICATIONS


Acknowledgment

I wish to acknowledge the collaboration with Dr. Benjamin Bechtel from the University of Hamburg for support, advice and data provision.

You can find me on ResearchGate or e-mail me at panosis@noa.gr

METHODOLOGY

BASIC STEPS:

- Coarse scale LST Image.
- Fine-scale LST Predictors
- Establishment of a regression model
- Upscaling to coarse scale resolution
- Application of the derived model to the fine-scale LST Predictors
- Fine Scale LST Image.

The LST Predictors are spatially distributed auxiliary data that are statistically correlated to LST and thus can explain its spatial variation.

RESULTS & DISCUSSION

In my research I have downscaled a three month long time series of MSG-SEVIRI LST data using a set of 17 LST predictors and a SVM as a regression tool and thus assessed the accuracy, correct pattern-formation and the spatiotemporal inter-relationships of the downscaled LST data.

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CONCLUSIONS

- The downscaling of frequently-acquired geostationary LST data has the potential to compensate the lack of high spatiotemporal LST data.
- The downscaling of urban LST is more challenging than rural LST.
- A successful downscaling of LST time series should result in a smooth diurnal evolution of DLST values and patterns and emulate the short-term and seasonal features of the coarse-scale LST.