

**W. Moutier, N. Clerbaux, A. Arboleda, M. Barrios, F. Gellens-Meulenberghs, J. Moreels, Q. Bourgeois, V. Sharma, M. Schröder and A. Tetzlaff.**

Contact: [william.moutier@meteo.be](mailto:william.moutier@meteo.be)

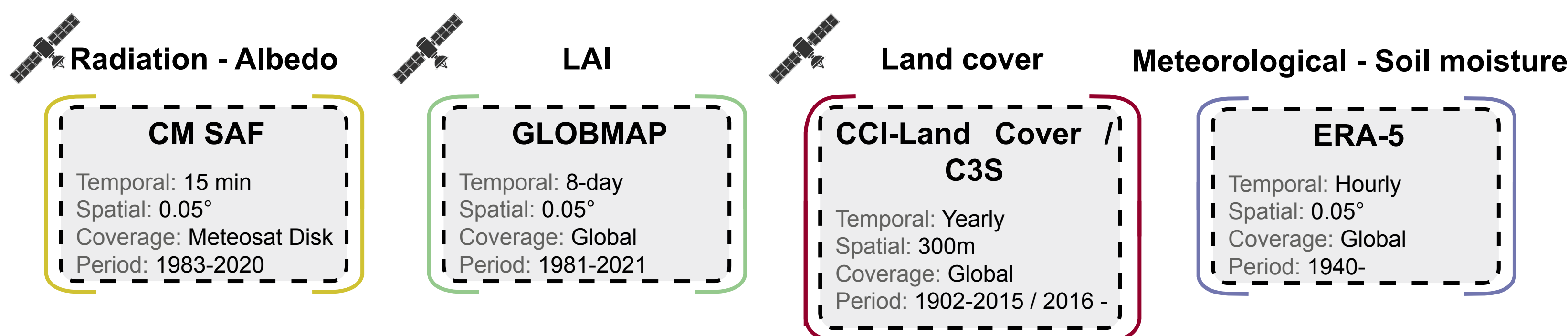
Land surface heat and water vapour fluxes are key elements in the climate system: they materialize the feedback the land gives in return to the atmosphere. In order to better apprehend the changes of this feedback over the years, a long record of data is necessary. The exploitation of the observations from EUMETSAT METEOSAT suite of satellites is valuable in that perspective. Thus, the CM SAF Surface Radiation and Fluxes from Meteosat First and Second Generation - Edition 1 (LANDFLUX Ed. 1) providing, over a period of 38 years (1983-2020), various parameters depicting the surface states and radiation fluxes, including the Surface Radiation Balance (SRB), the Cloud Fractional Cover (CFC), the Land Surface Temperature (LST), the Evapotranspiration (ET) and the Latent (LE) and Sensible (H) Heat Fluxes. Overall, comparisons at stations showed errors in the same order of magnitude than the literature with, for instance, daily bias of  $-10.8 \text{ W/m}^2$  and  $-2.6 \text{ W/m}^2$  for LE and H respectively and, daily uRMSE of  $24.7 \text{ W/m}^2$  and  $34.1 \text{ W/m}^2$  for LE and H respectively.

## Characteristics

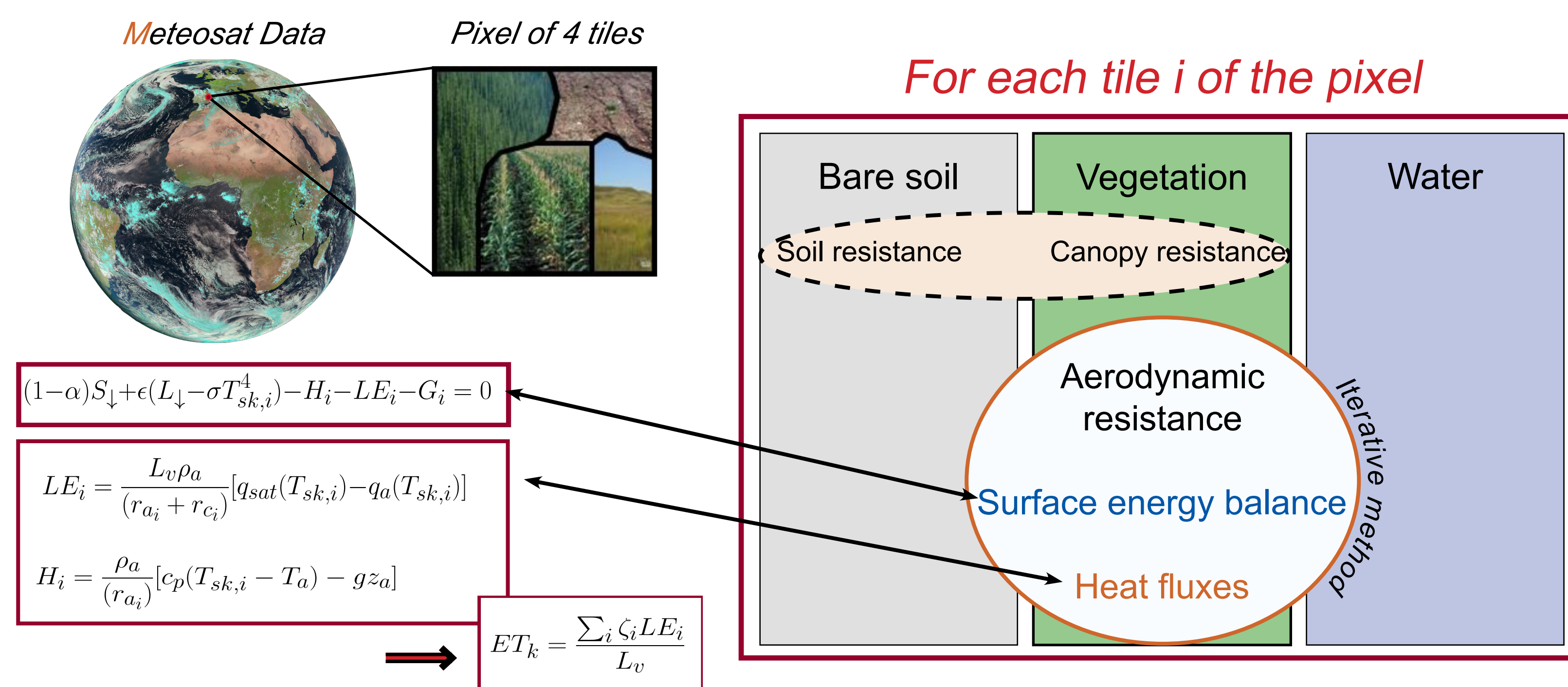
Parameters	Sensible and latent (evapotranspiration) heat fluxes
Sensors	MVIRI & SEVIRI
Methodology	Adaptation from the LSA SAF ET v2 algorithm
Coverage	Meteosat disk (60°N - 60°S; 60°W - 60°E)
Spatial Resolution	0.05° (~5 km)
Temporal Resolution	Hourly, daily, monthly and monthly mean diurnal cycle data
Period	1983-2020

## LE-H-ET Ed. 1 dataset

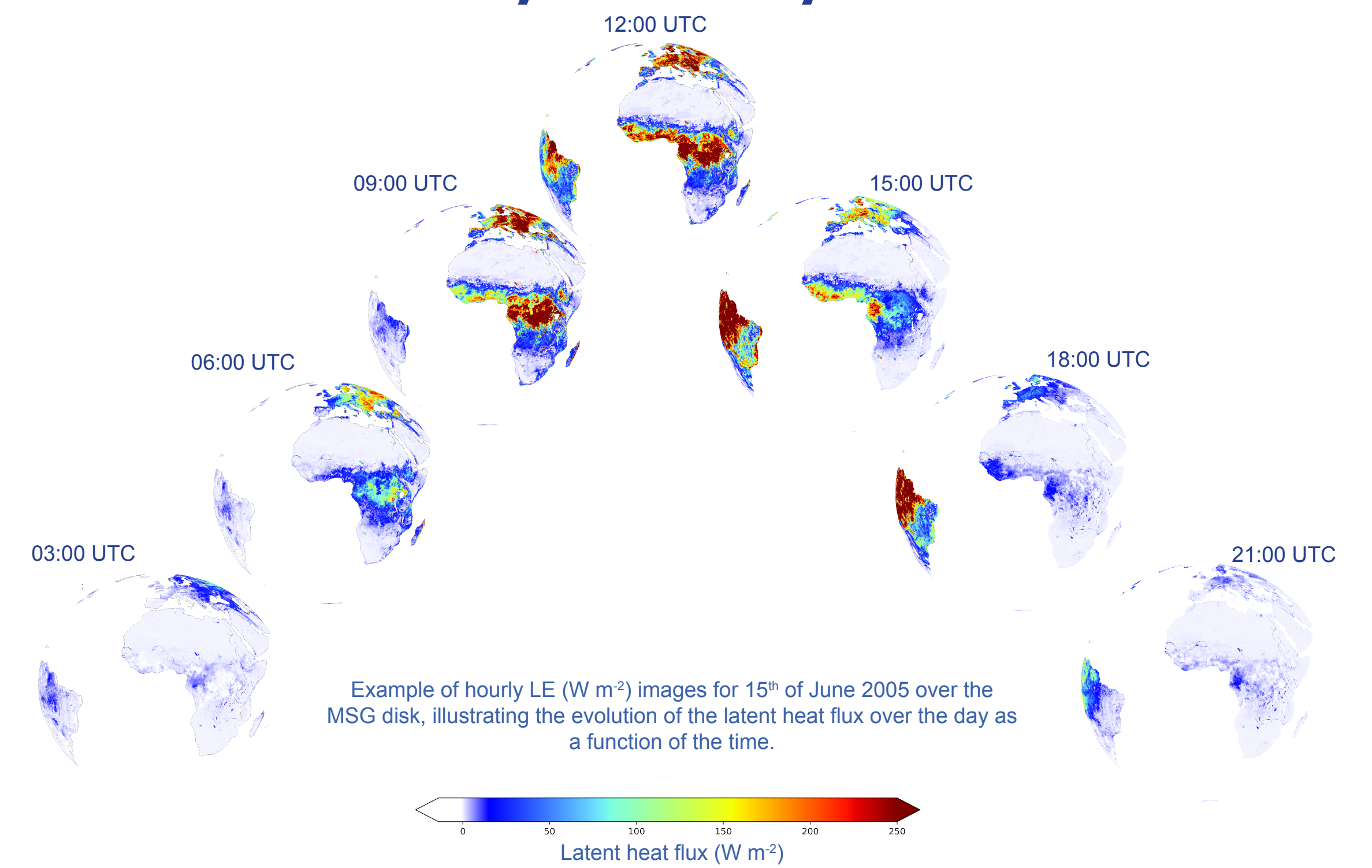
### Key Inputs



### Tile pixel approach model



### Output examples



### Important features

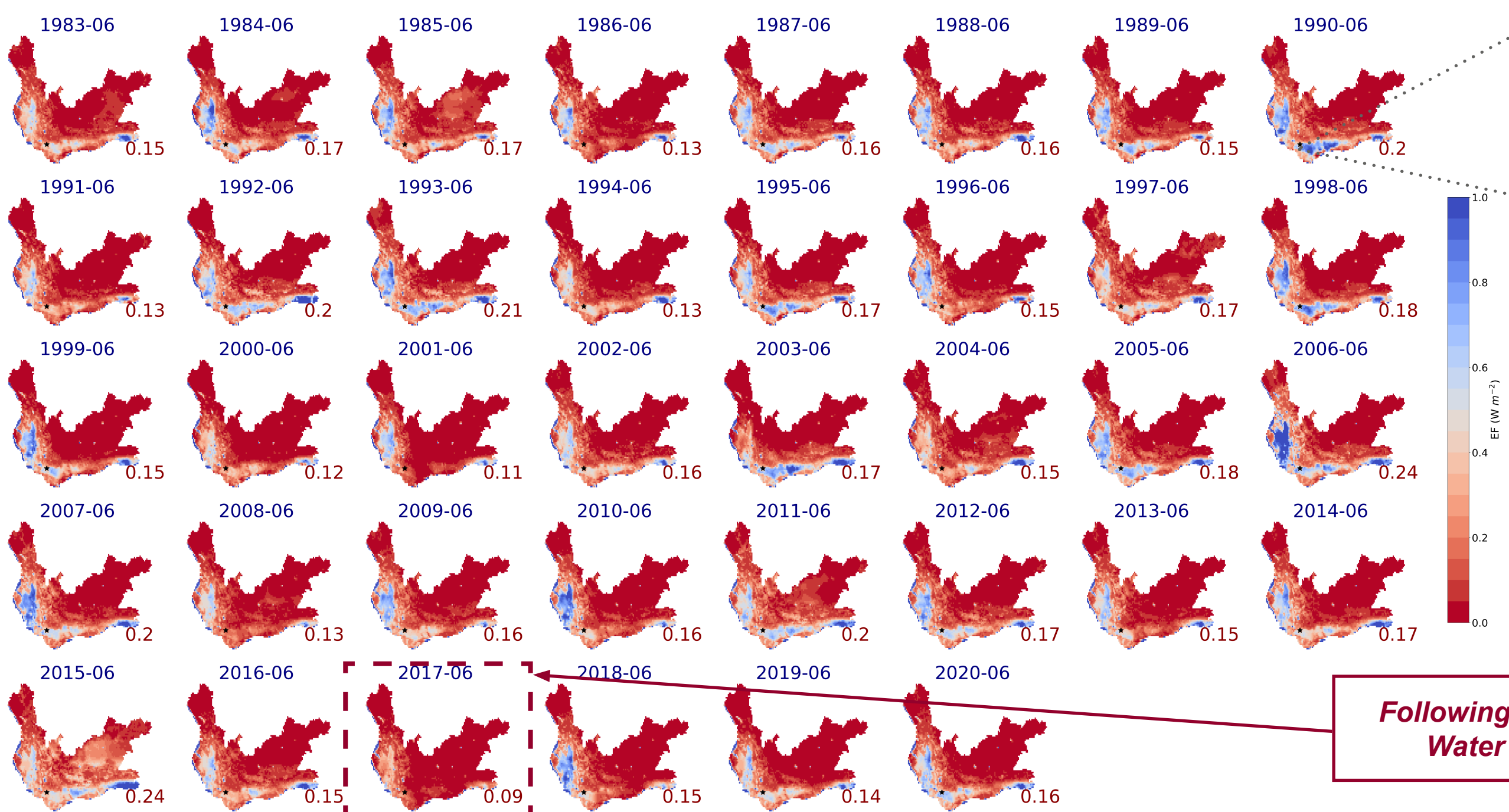
- Unique combination of high spatial and temporal resolutions → **Allows regional climate analysis.**
- 38 years dataset → **highly suitable for climate monitoring.**
- The **diurnal cycle** can be analyzed.
- The Meteosat field of view **covers a large domain.**
- Highly **complementary with other global datasets** with lower spatial and/or temporal resolution or covering lower time period (e.g. GLEAM, ERA-5, LSA SAF).
- Results at stations are **in-line with other datasets and the literature.**

## Use case : Evaporative fraction (EF) over Western South Africa during winter (June)

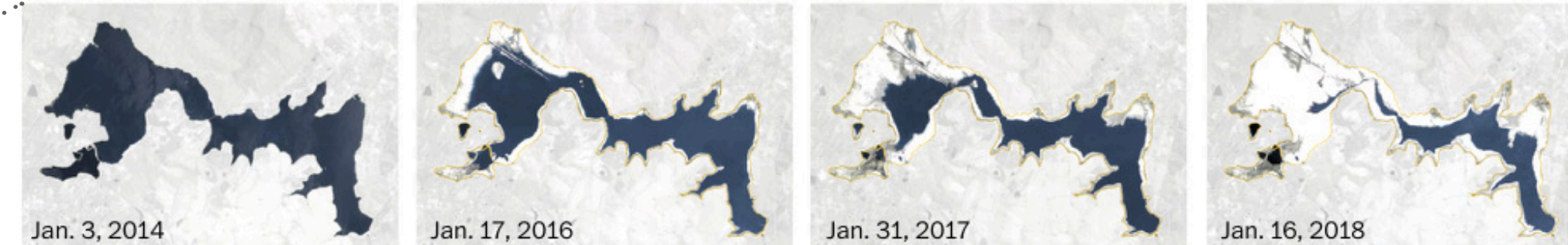
Background:  $EF = \frac{LE}{LE+H}$  Parameter reflecting the distribution of surface available energy.

Context: The Western Cape obtains most of its water from dams that capture rainfall during rainy season (May to August). Thus, supply system relies almost entirely on rainfall. From 2015 to 2018, dam levels decline which end-up, after serious drought, in a water crisis.

### Monthly EF (June):



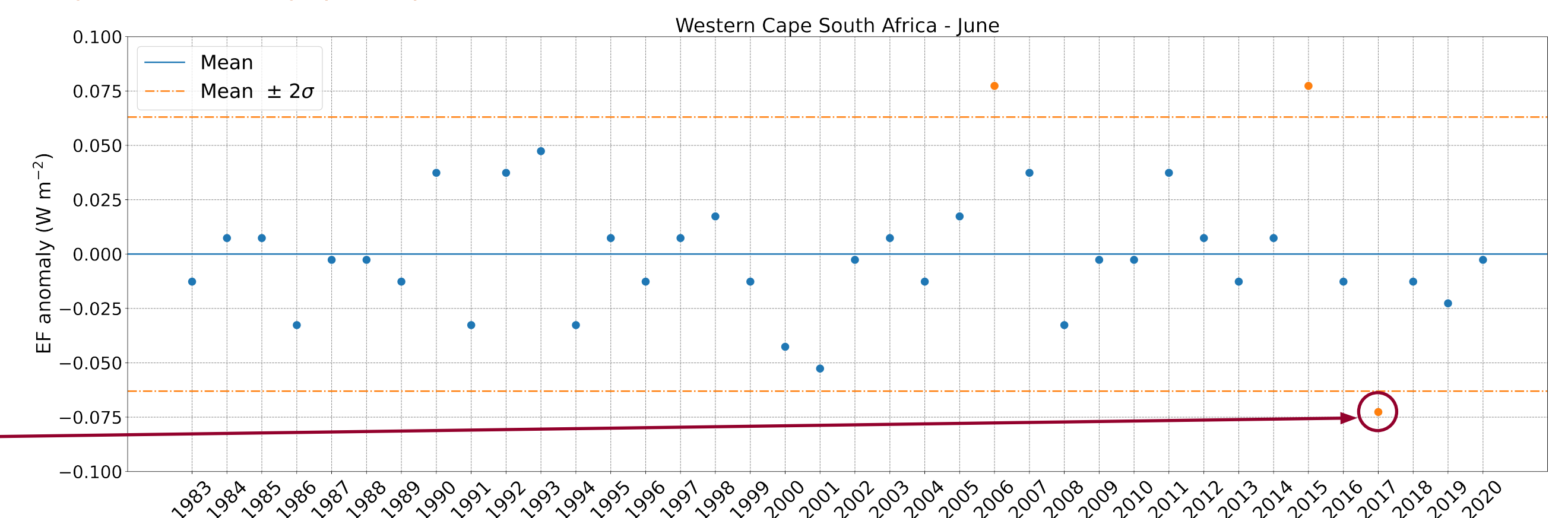
### Theewaterskloof water levels on the decline



### Landsat and Sentinel images



### Monthly EF anomaly (June):

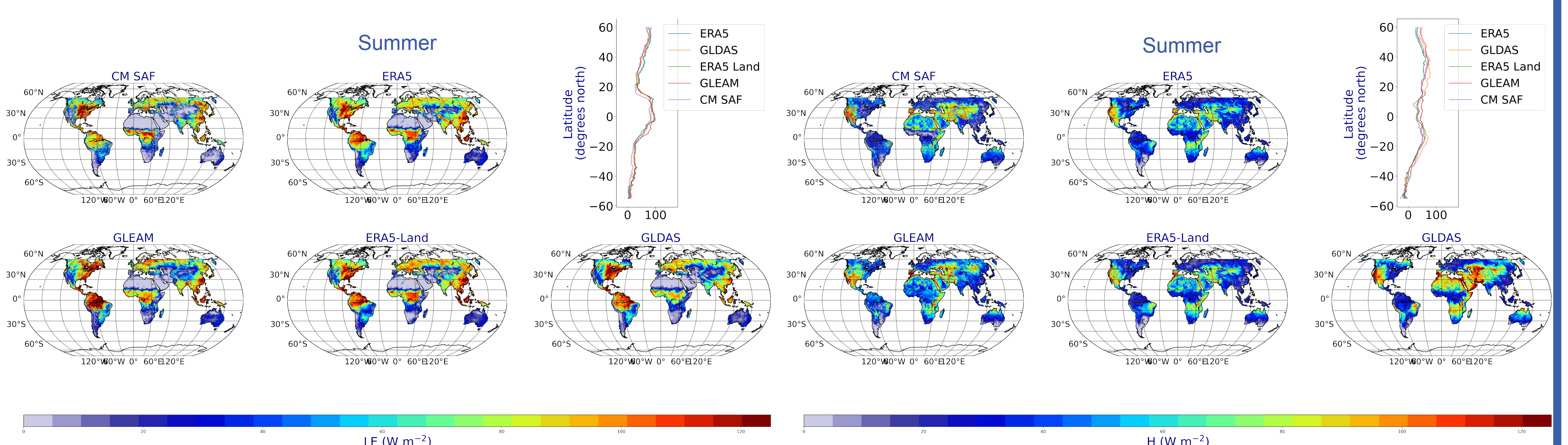


## Future : GEO-Ring prototype

### Characteristics

Parameters	Sensible and latent (evapotranspiration) heat fluxes
Sensors	MVIRI & SEVIRI, GEOS-E/W, HIMAWARI (60°N-S; 180°E-W)
Methodology	Adaptation from the LSA SAF ET v2 algorithm
Coverage	Meteosat disk (60°N - 60°S; 180°W - 180°E)
Spatial Resolution	0.05° (over land)
Temporal Resolution	0.5° (over water from HOAPS for daily and monthly data)
Temporal Resolution	Hourly (land), daily, monthly and monthly mean diurnal cycle (land) data
Period	2020

### Preliminary results\*



\*Radiations and albedo inputs from ERA-5.

**Data accessibility :** CM SAF Website ([https://doi.org/10.5676/EUM\\_SAF\\_CM/SLF\\_METEOSAT/V001](https://doi.org/10.5676/EUM_SAF_CM/SLF_METEOSAT/V001)).

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