EKF assimilation at ZAMG

Stefan Schneider

LACE Data Assimilation Working Days 2016

Sep 21-23, 2016

Budapest

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Meteorologie und
Geodynamik

Current activities

2015/16: Sentinel-1 soil moisture assimilation in AROME[1]

SURFEX: version 7.3 / 8.0, (s)EKF assimilation
MODEL: AROME CY40T1
2.5km grid (1.25km planned), 90 layers
DATA: combined Sentinel-1 and ASCAT SWI (soil wetness index)
spatial resolution: 1km; temporal resolution: 1 day

[1] Funded by Austrian Research Promotion Agency (FFG) project CRESSIDA (No 848010)

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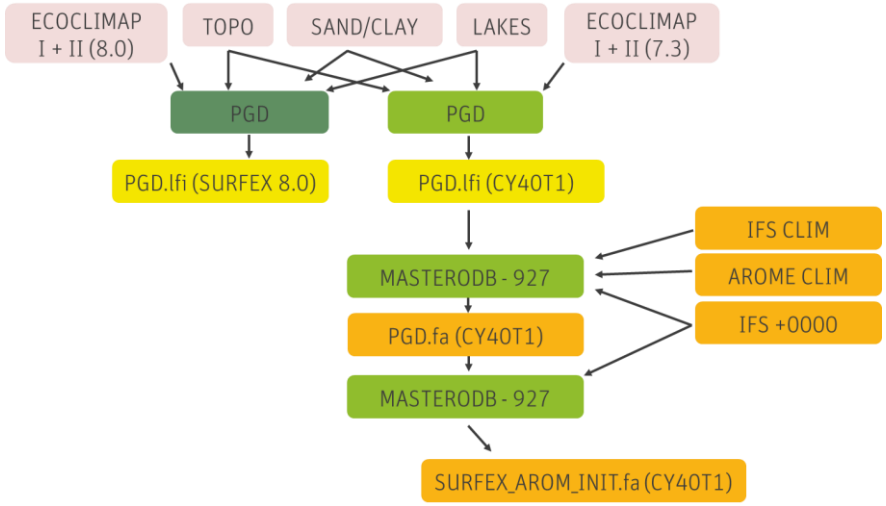
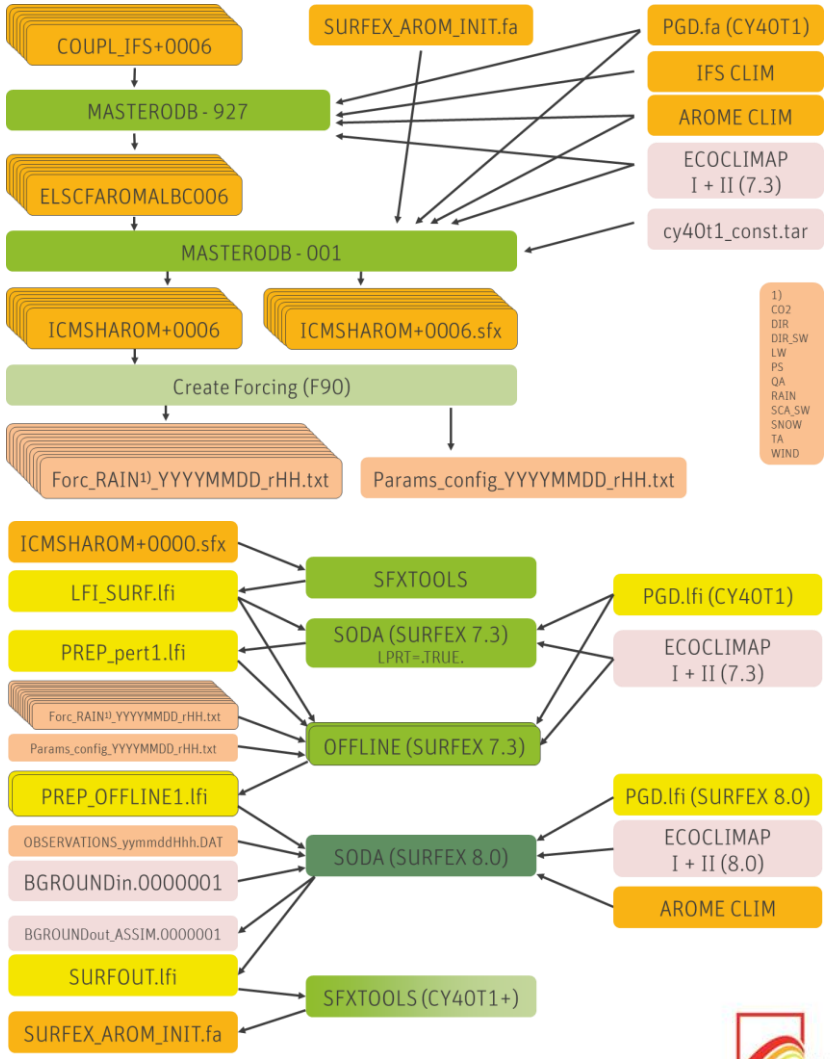
Technical implementation: overview





EXECUTABLE: CY40T1

EXECUTABLE: SURFEX 8.0

EXECUTABLE: ZAMG.F90

FILE: FA

FILE: LFI

FILE: ASCII

FILE: BINARY

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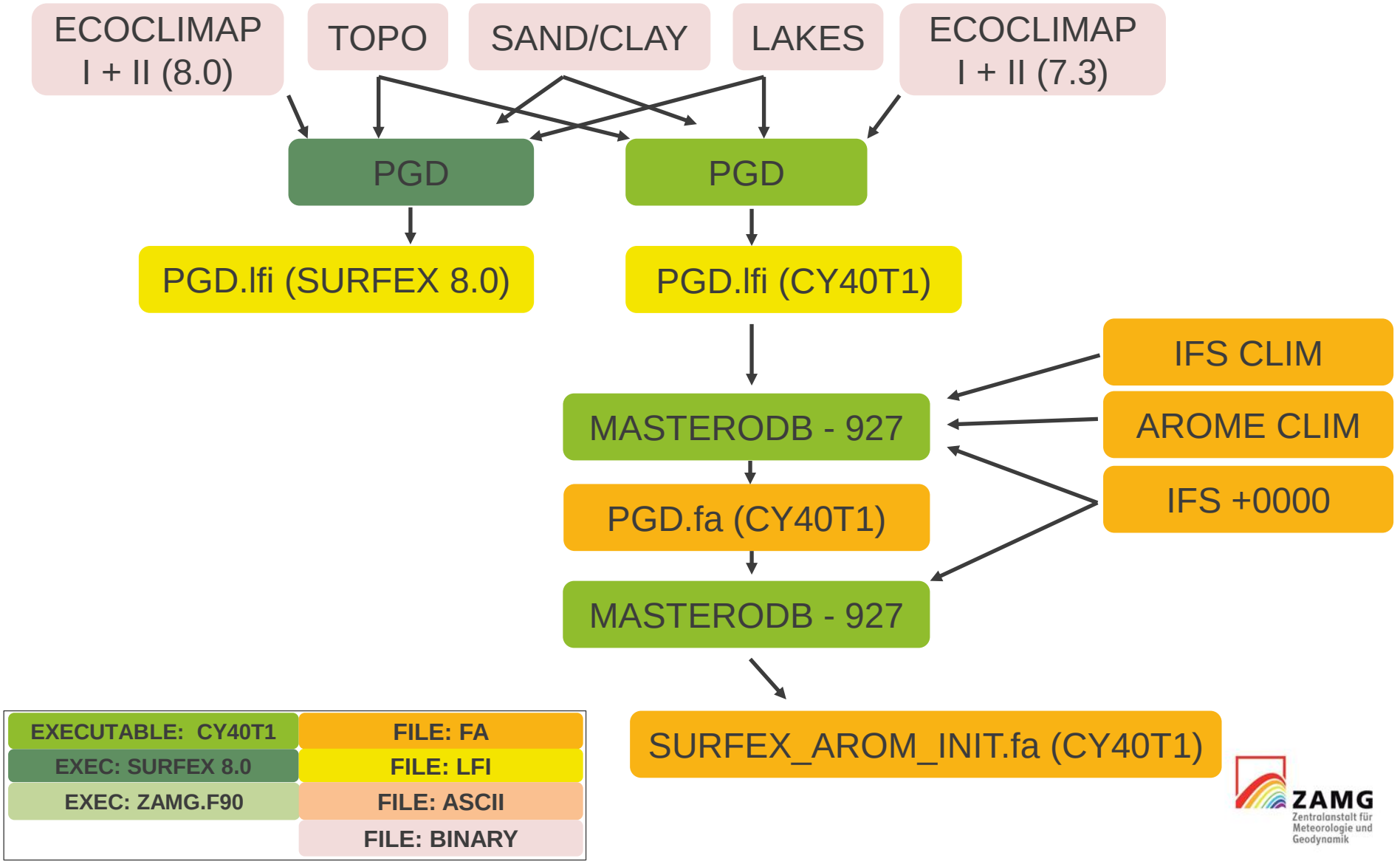
Technical implementation: Initiation



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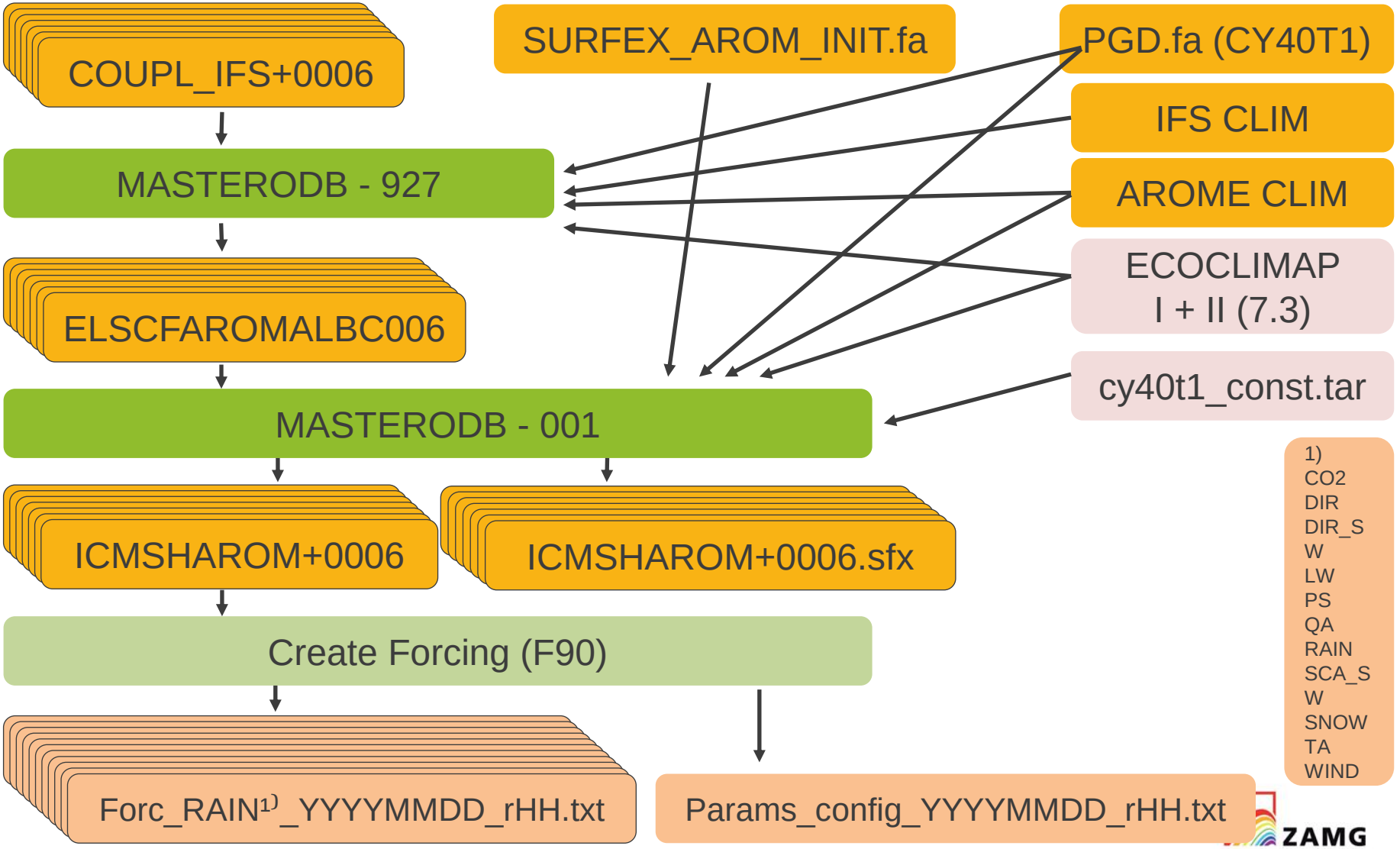
Technical implementation: Forecast step



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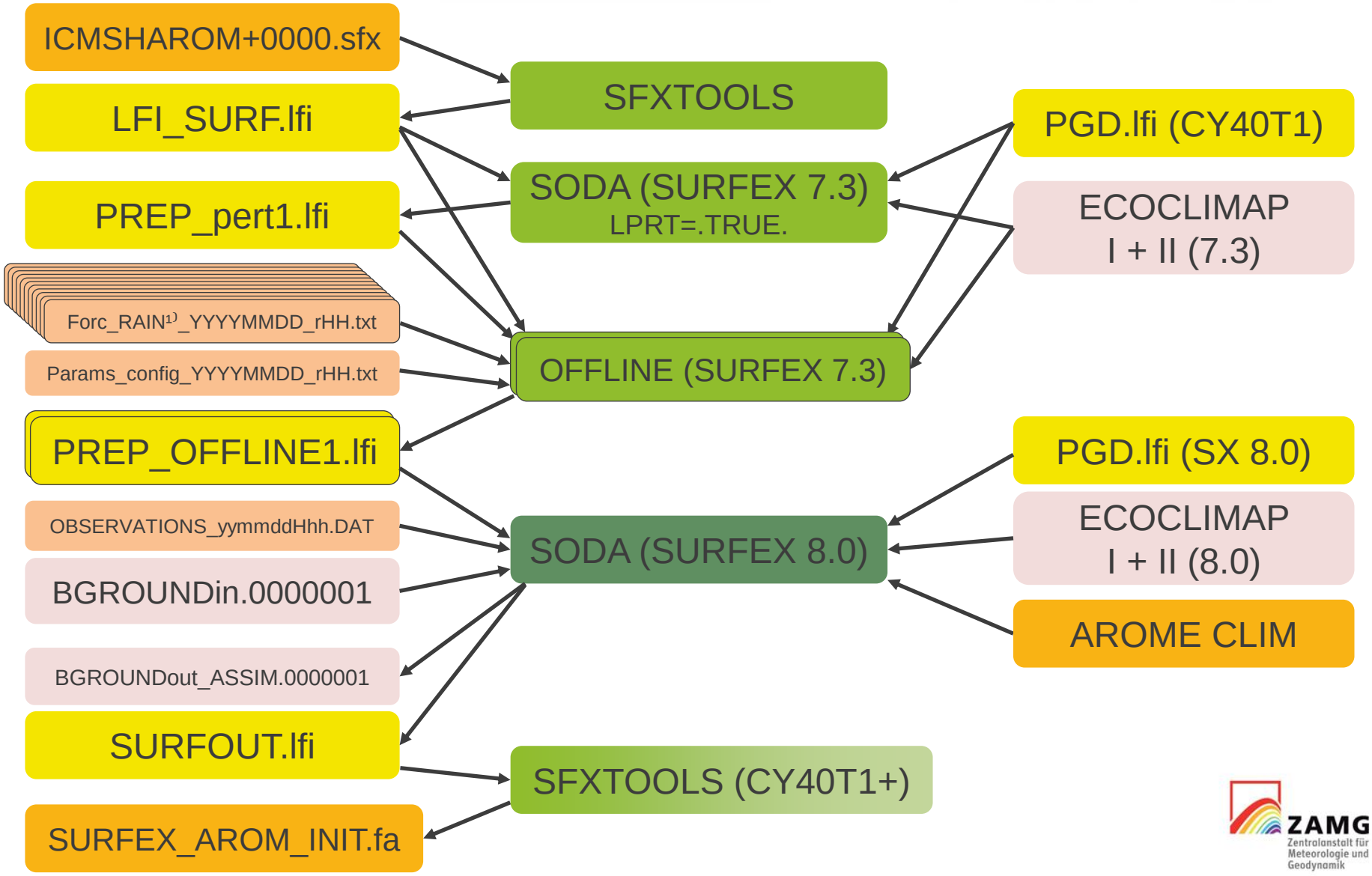
Technical implementation: Assimilation



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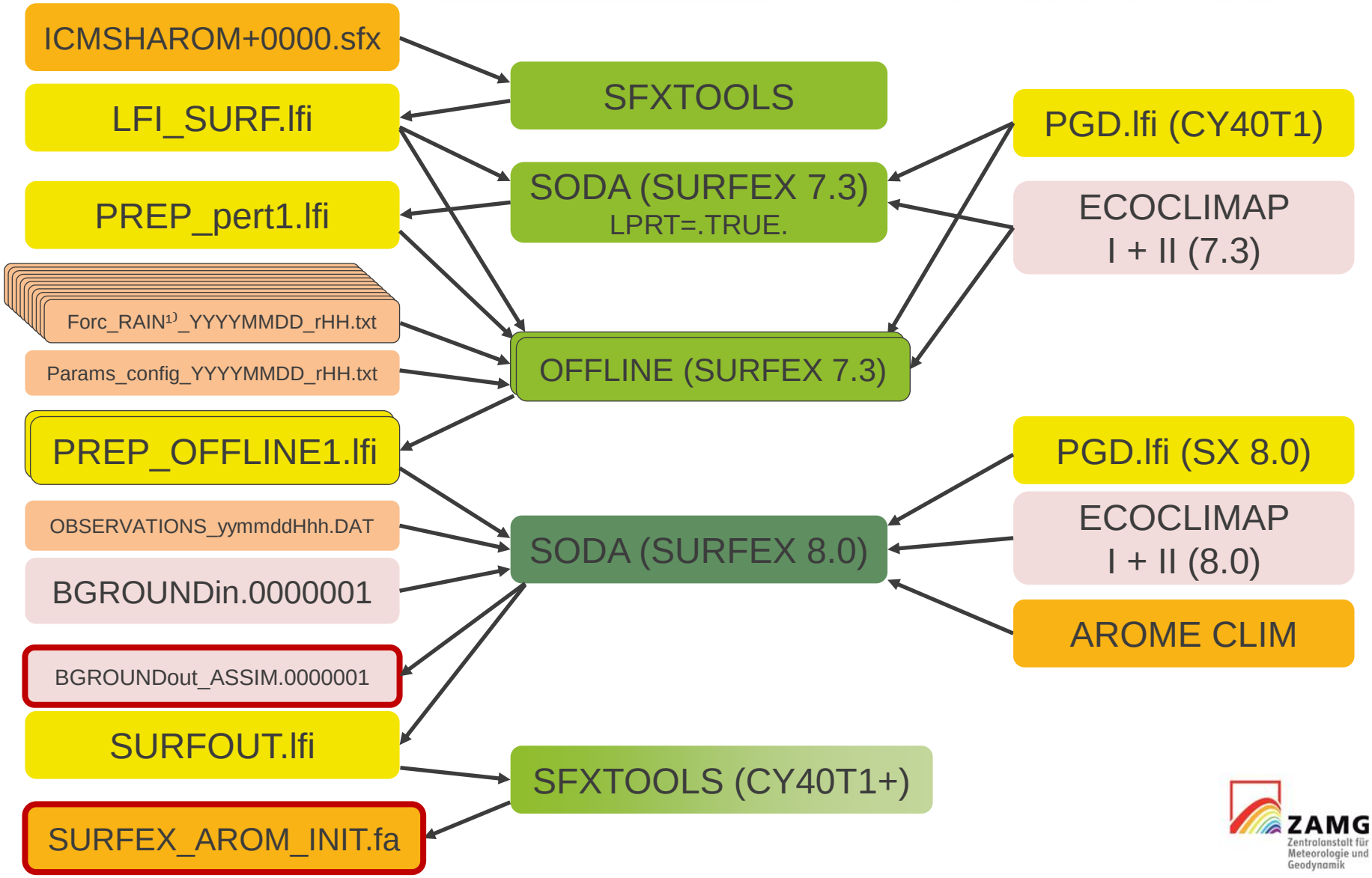
Technical implementation: Assimilation



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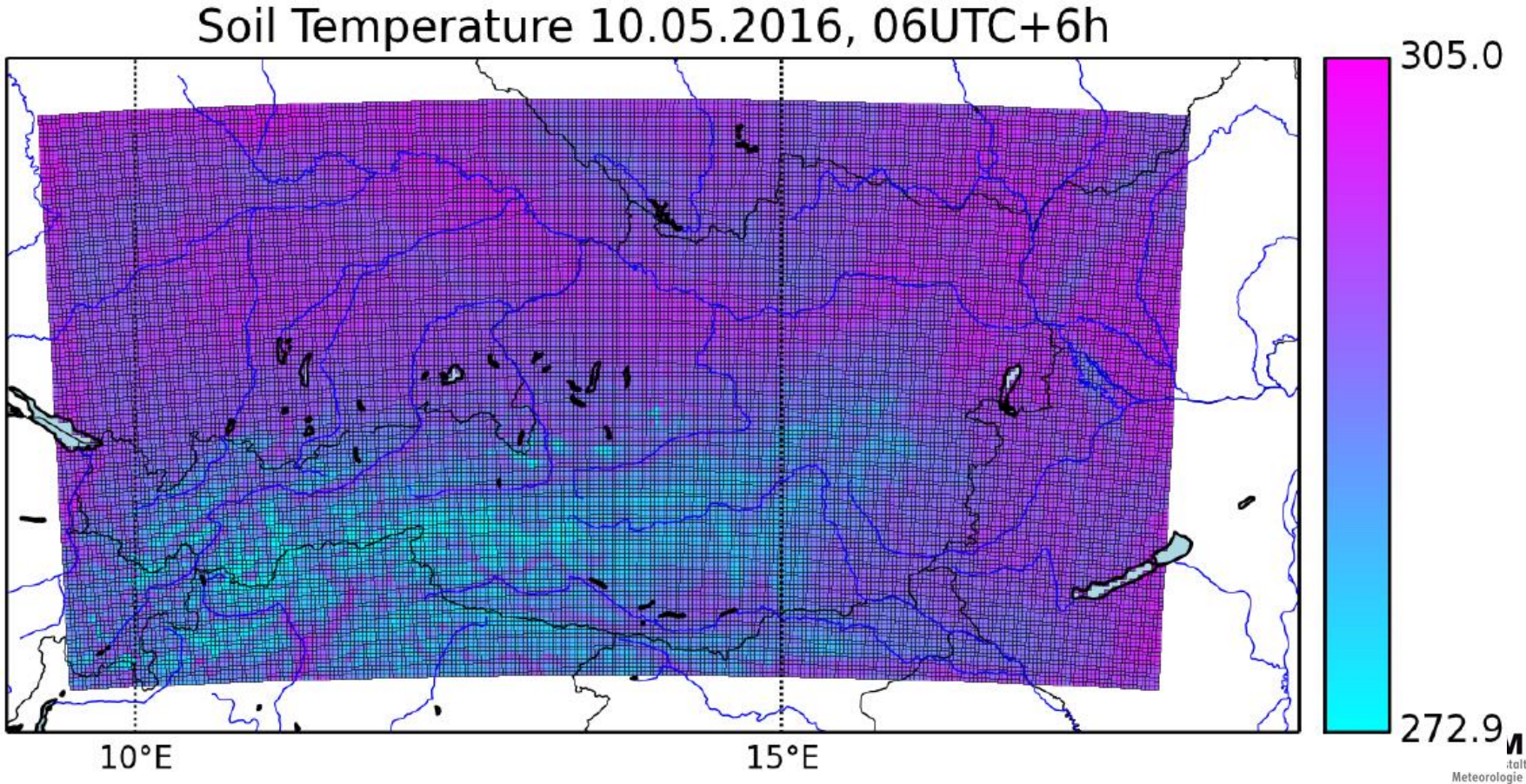
Technical implementation: Bugfix

If the domain contains no sea grid points, reading the surface LFI file will cause an abort of the subroutine – „SST temperature is missing“

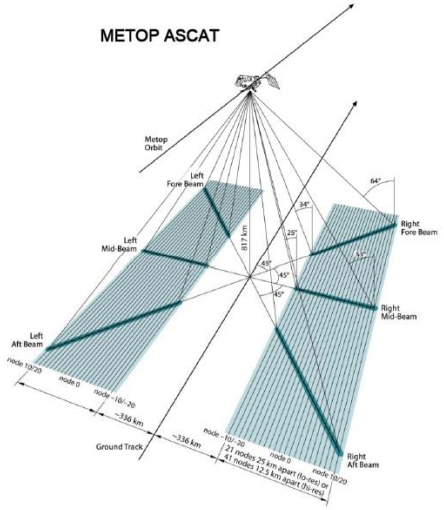


Satellite data

Sentinel-1A

spatial resolution: 20m
temporal resolution: ~5 days
Data availability: ~3 hours after the measurement

soil moisture value valid for 0-2cm depth



Advanced Scatterometer on board METOP

spatial resolution: 25km
temporal resolution: ~1.5 days
Data availability: ~2 hours after the measurement

soil moisture value valid for 0-2cm depth

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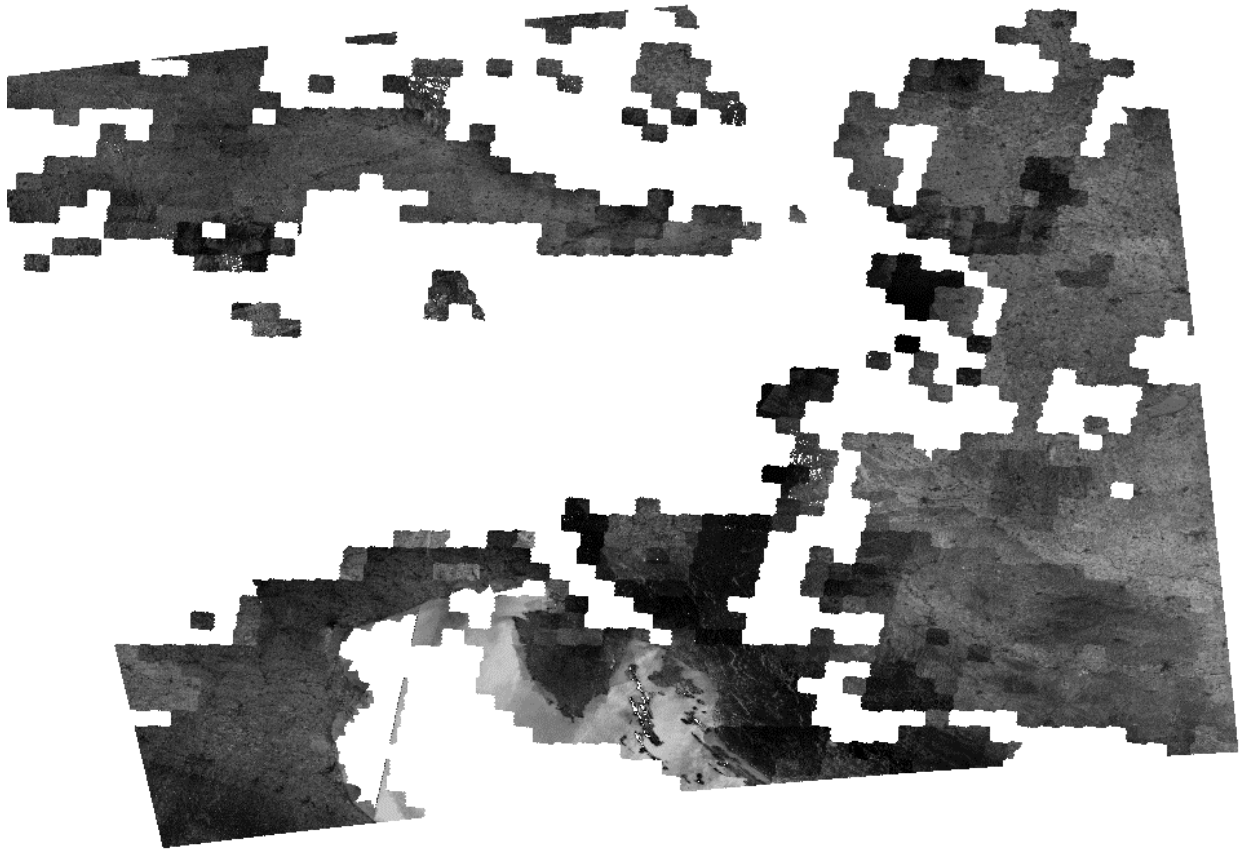
Satellite data

TU Wien combines these two data sets to a SWI on a 1km grid, available daily for 12UTC (starting 01/01/2015)



T001, 19.01.2016

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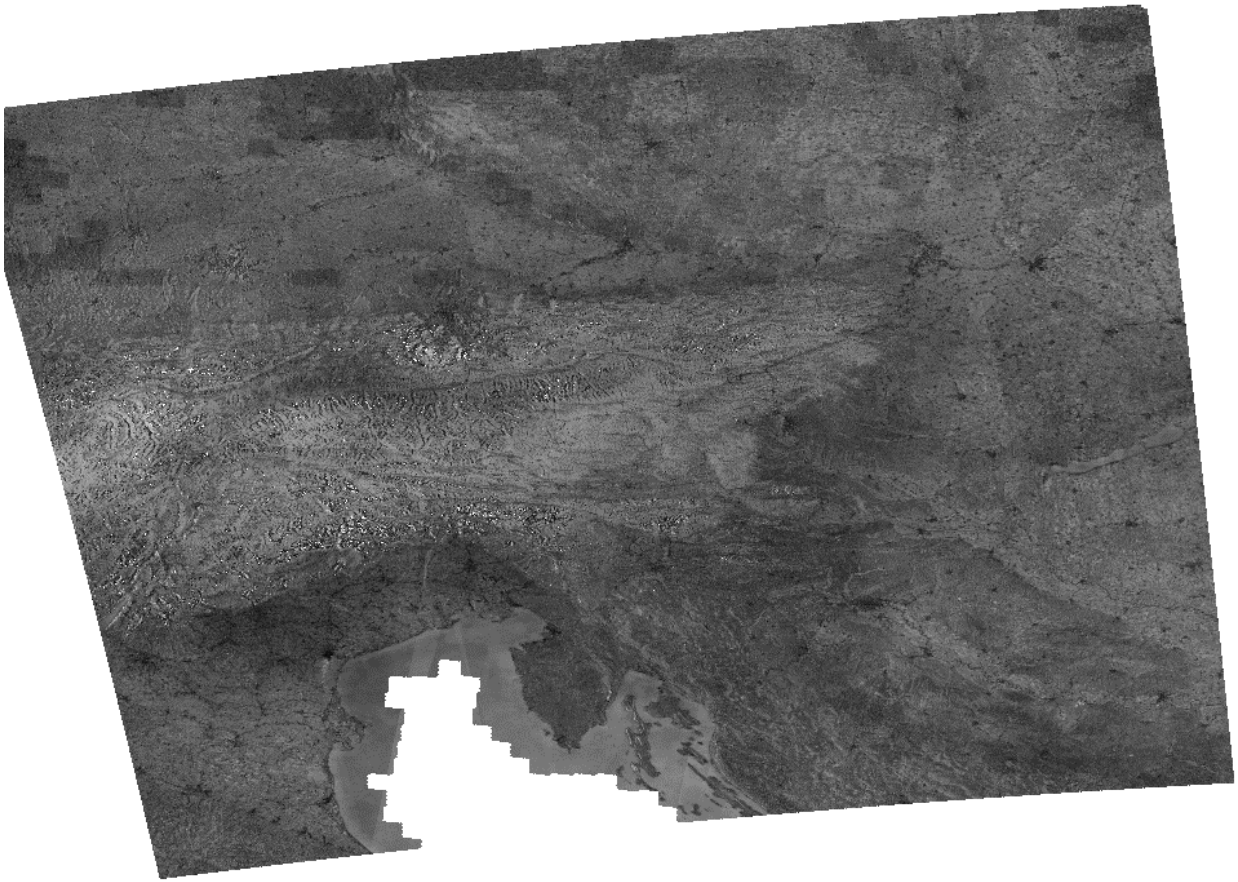
Satellite data

TU Wien combines these two data sets to a SWI on a 1km grid, available daily for 12UTC (starting 01/01/2015)



T100, 19.01.2016

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New feature added in SODA 8.0

SODA 8.0

Control variables:	Observations:
TG1	T2M
TG2	
	RH2M
WG1	WG1
WG2	
LAI	LAI
	SWE

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New feature added in SODA 8.0

SODA 8.0.zamg

Control variables:	Observations:
TG1	T2M
TG2	
	RH2M
WG1	WG1
WG2	**WG2**
LAI	LAI
	SWE

Versioning control system GIT introduced at ZAMG lately

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Ongoing work

Error estimation for SWI(WG2) – how to do?

Test runs for spring 2016 and verification
(mainly testing the impact on convective rainfall and T2M)

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Planned activities

2016-18: Sentinel-3 LST assimilation in AROME[1]

SURFEX: version 8.x, (s)EKF assimilation

MODEL: AROME CY?T? (depending on availability)
1km to 2.5km grid, 60/90 layers

DATA: combined Sentinel-3[2] and MSG land surface temperature (LST)
spatial resolution: 1km; temporal resolution: 1 day

OUTCOME (planned):

Software included in SODA to assimilate LST – this work should be well coordinated with all partners in ALADIN/HIRLAM/LACE

Improved short-range forecasts

[1] One person for 2.5 years will be funded by Austrian Research Promotion Agency (FFG) project ASTRID

[2] Launched in February 2016, shall start to provide operational data in summer 2016

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The End

Thank you for your attention!

Work has been funded to a large part by FFG-project CRESSIDA (project number 848010).

FFG

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