





## Sensitivity of WRF Land Surface Schemes to Land Cover Classification over Complex Alpine Terrain

EGU - AS2.5 - Air-Land Interactions

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# Numerical Design WRF set-up

• WRF 4.0

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- NOAH LSM scheme
- MYNN2 PBL scheme
- MM5 revised SL scheme
- RRTMG LW and SW radiation scheme
- 3 one way nested domains
- Hindcast of Valley Wind Day of the 19<sup>th</sup> August 2018 started the 18<sup>th</sup> at 1200
- 4 Land Covers: CLC12, CLC18, MODIS, USGS





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# Observations and Land Cover Representation in the Inn Valley

Valley Floor (VF0)

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- i-Box 6 Eddy-Covariance Stations (ECS)
- Bolzano University: 2 ECS (Valley-Floor and 45 m over forest)
- Atmospheric Weather Stations (AWS) ~10 stations
- Roof top of Innsbruck University: Wind/Humidity passive profiler and LIDAR wind profiler and ECS
- Daily radiosounding at 00H at Innsbruck airport



North Facing Slope (NF27)



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Inn Valley

Near Surface Temperature For Steep Slope and Valley Floor Stations

> No significant influence of the the Land Cover Classification on Near Surface Temperature

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 4 equivalent LU categories leads to similar Heat Fluxes



CLC18

MODIS

# What about TKE? Slope and Valley-Floor Sites and Valley distribution

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CLC18

 $< TKE >_{vallev} = 2.93 m^2 s^{-2}$ 

47.8N

47.6N

![](_page_5_Picture_2.jpeg)

CLC12

 $< TKE > _{vallev} = 2.97 m^2 s^{-1}$ 

47.8N

47.6N

## Short Summary

### Experiment

- WRF simulations at 1km resolution
- Sensitivity on 4 Land Use data-sets
- Energy and Turbulence observations

## Keys Results

- Near Surface Temperature is not locally sensible
- H and TKE are locally sensible
- The overestimation of the forest leads to an overestimation of the mean spatial valley TKE

#### Not shown today ..

- SL schemes sensitivity
- Semi-idealized simulations
- Mosaic/ Dominant option sensitivity
- Use of others types/ locations of obs.
- Others days simulated...

Many thanks ! You can reach me at gaspard.simonet@uibk.ac.at

![](_page_6_Picture_16.jpeg)