



# Investigating the effect of a dedicated scheme for urban areas (TERRA\_URB) in a kilometre-scale ICON forecasting configuration

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Yann von der Weid – Master's Thesis

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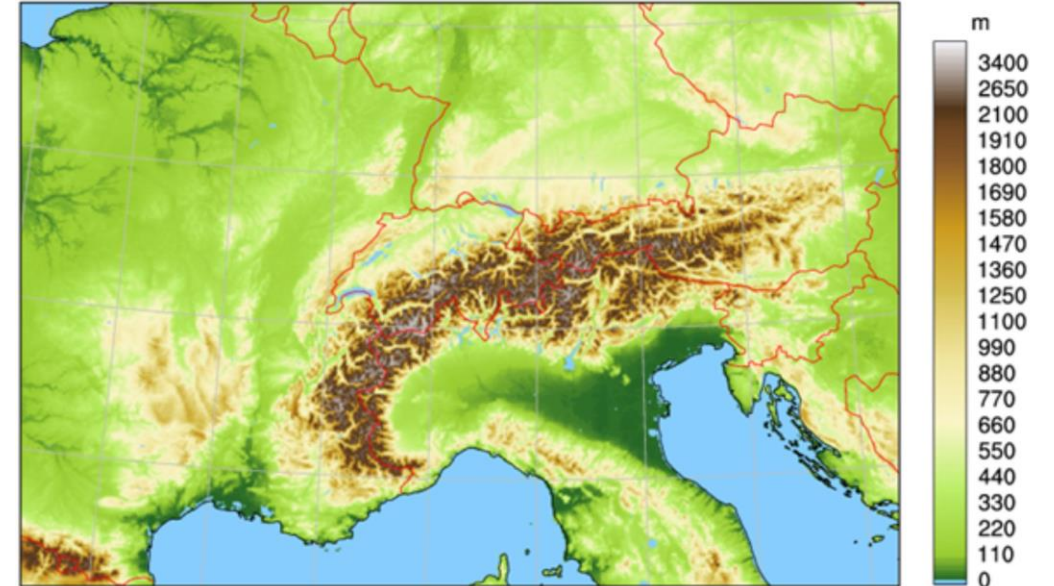
28<sup>th</sup> COSMO General Meeting

15.09.2026



# ICON Model Configuration

- 1 km resolution (also 500 m)
- Deterministic forecasts
- 48h lead time
- Verification 24-48 h (spin-up)
- Verification with default MCH stations & urban station selection
- Domain: Alps
- Rest according to standard operational MCH configuration



ICON MCH Domain

MeteoSwiss, 2026

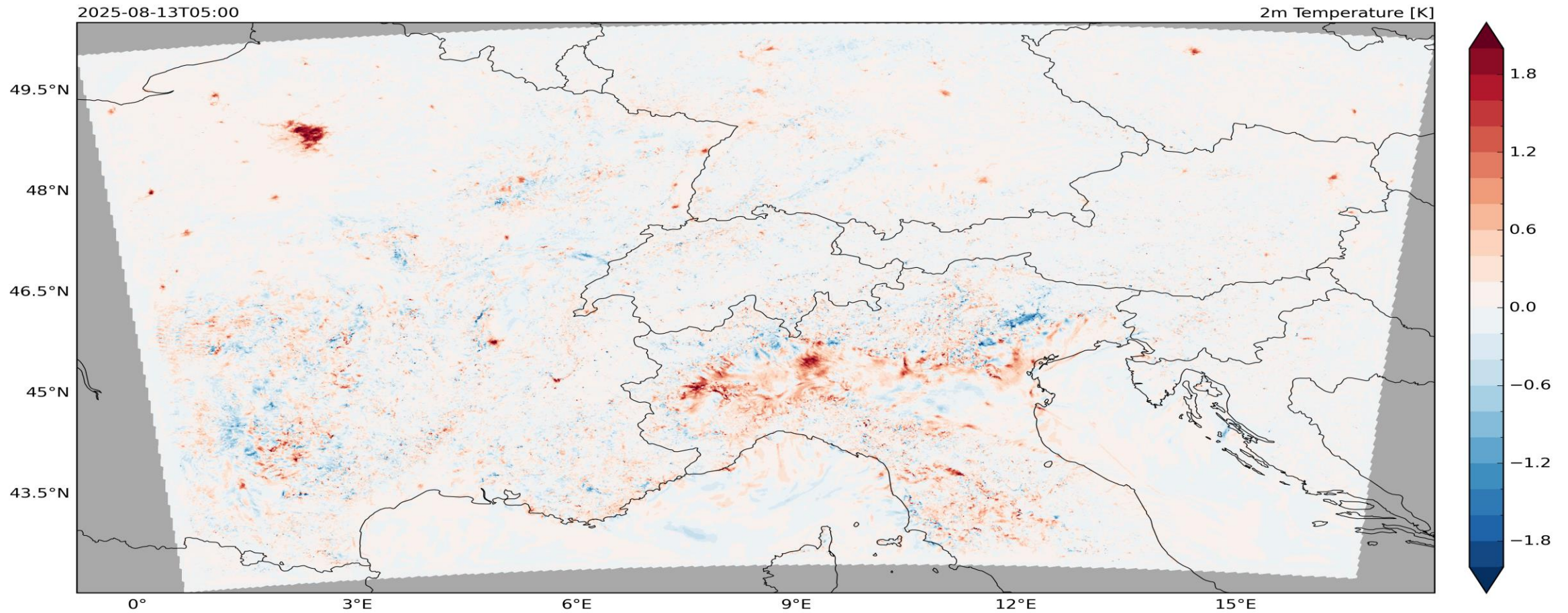
# Urban Station selection



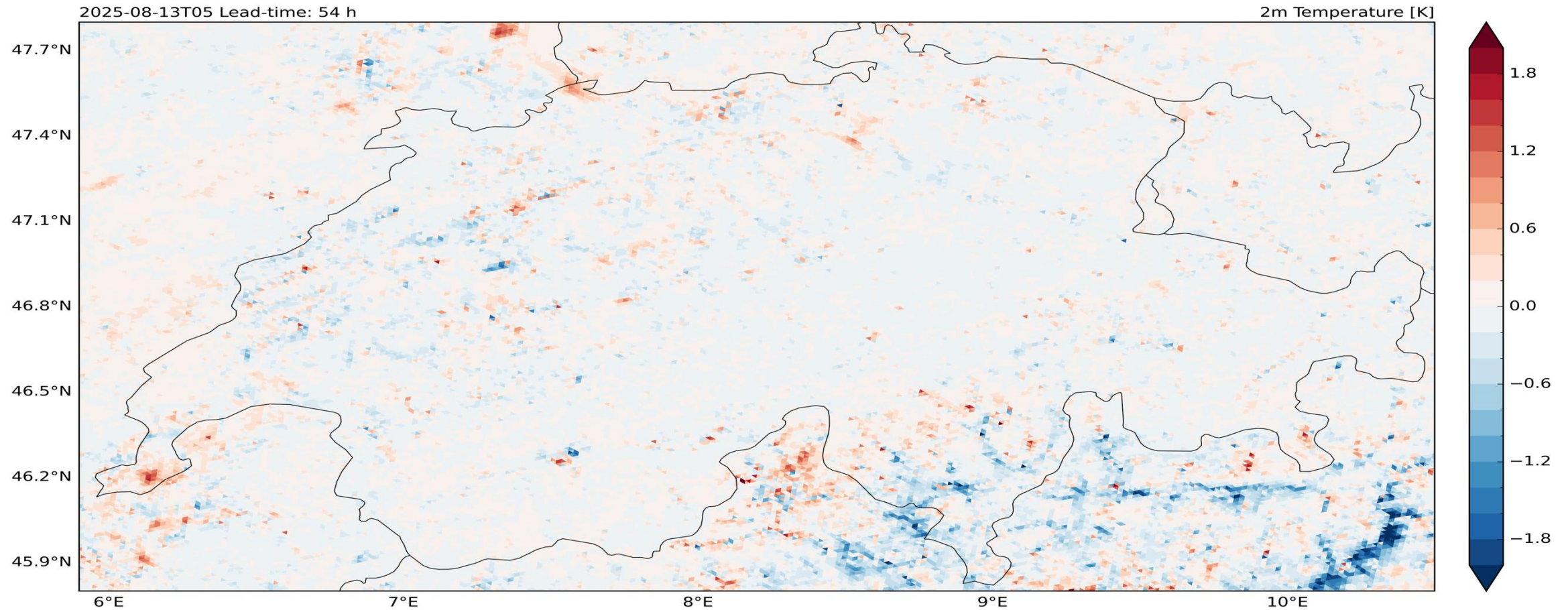
- 20 stations

|                                               |                                |                                              |                        |                              |
|-----------------------------------------------|--------------------------------|----------------------------------------------|------------------------|------------------------------|
| 11 - Consolidated surfaces                    | 17 - Mix of small structures   | 35 - Permanent garden plants and brush crops | 46 - Linear woods      | 61 - Water                   |
| 12 - Buildings                                | 21 - Grass and herb vegetation | 41 - Closed forest                           | 47 - Clusters of trees | 62 - Glacier, perpetual snow |
| 13 - Greenhouses                              | 31 - Shrubs                    | 42 - Forest edges                            | 51 - Solid rock        | 63 - Wetlands                |
| 14 - Gardens with border and patch structures | 32 - Brush meadows             | 43 - Forest strips                           | 52 - Granular soil     | 64 - Reedy marshes           |
| 15 - Lawns                                    | 33 - Short-stem fruit trees    | 44 - Open forest                             | 53 - Rocky areas       | ● Stations                   |
| 16 - Trees in artificial areas                | 34 - Vines                     | 45 - Brush forest                            |                        |                              |

# Difference TUT-TUF

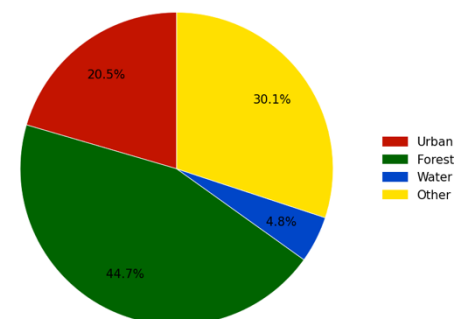
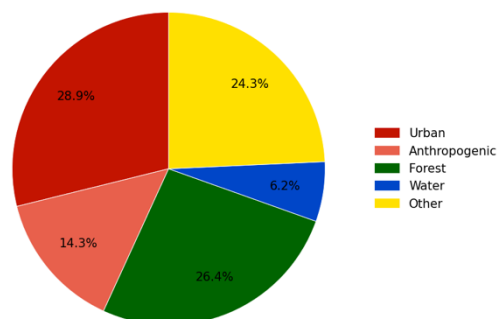
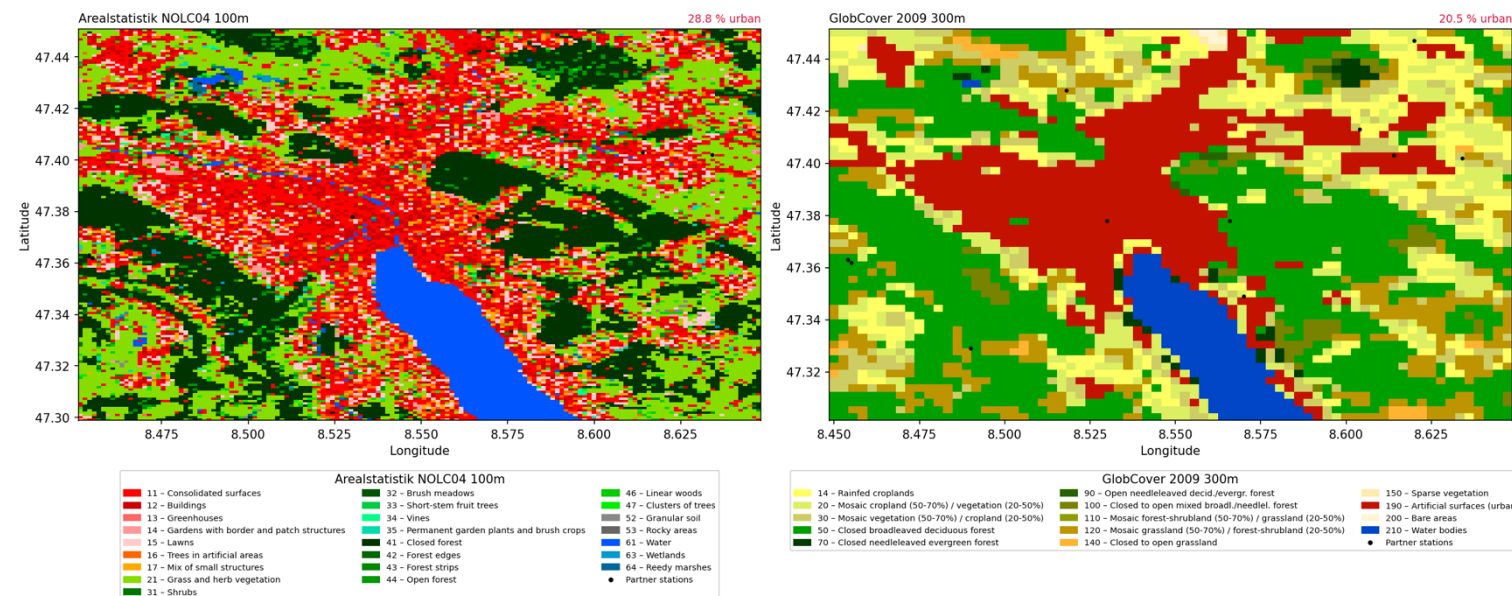


# Difference TUT-TUF



# Land-Cover Comparison Reference Zürich

## Reference      GlobCover2009



# Land-Cover Datasets Comparison Zürich

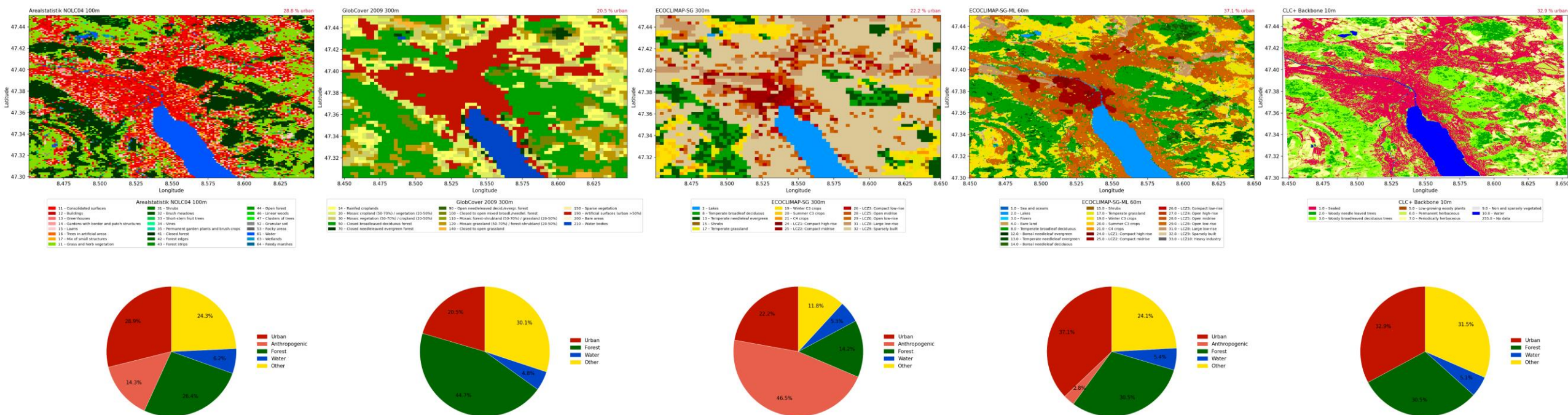
Reference

GlobCover2009

ECO-SG

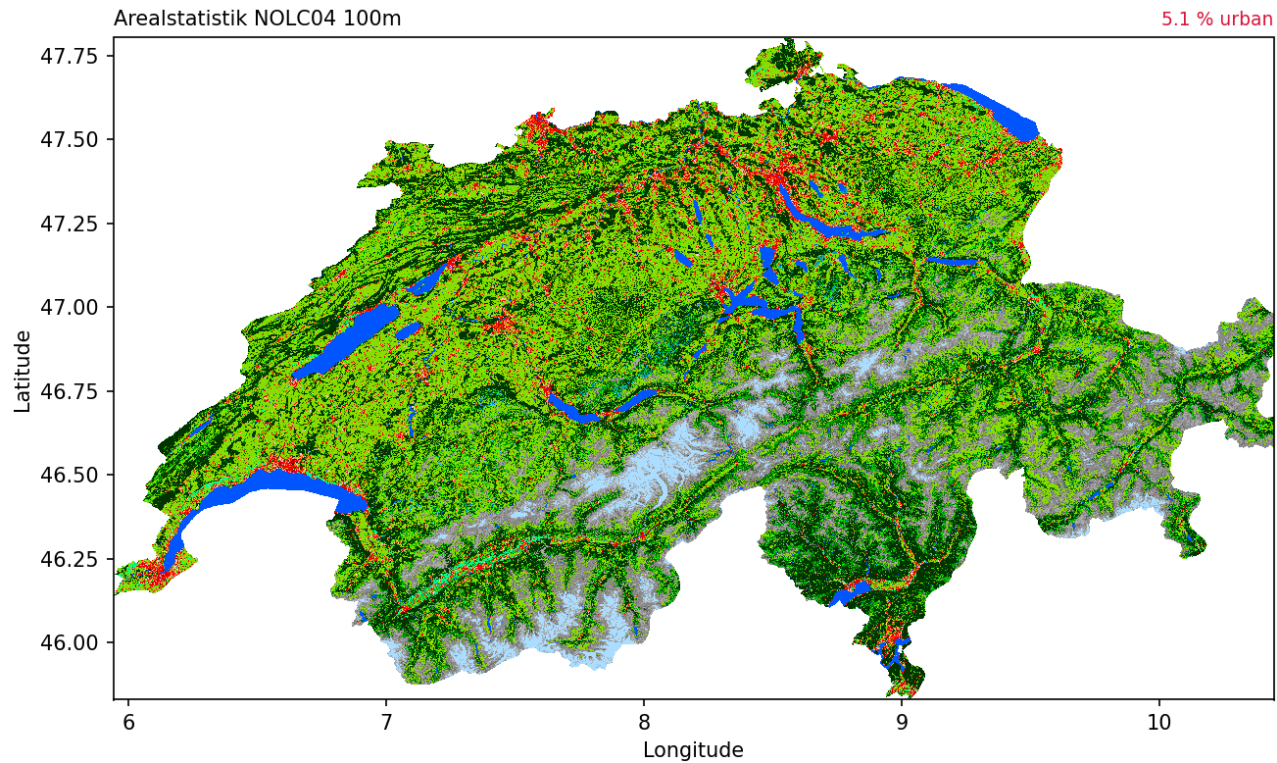
ECO-SG-ML

CLC

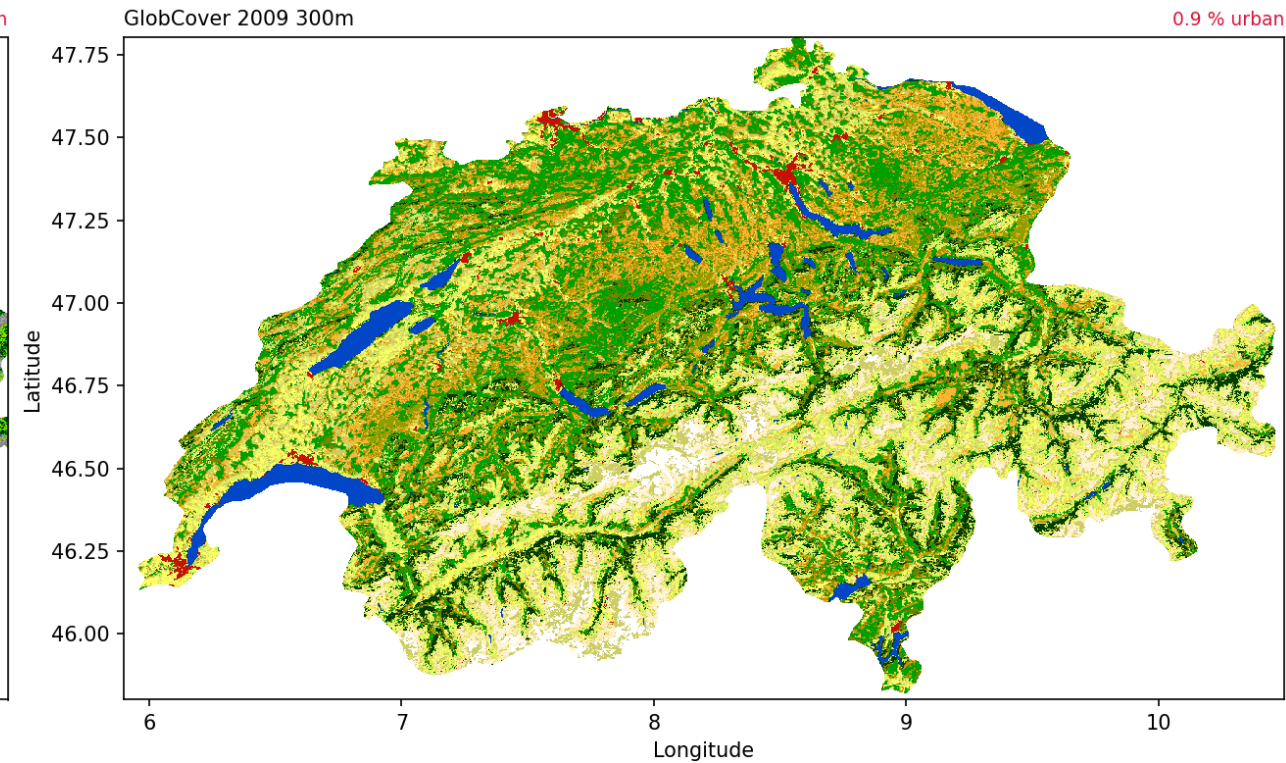


# Land-Cover Datasets Comparison

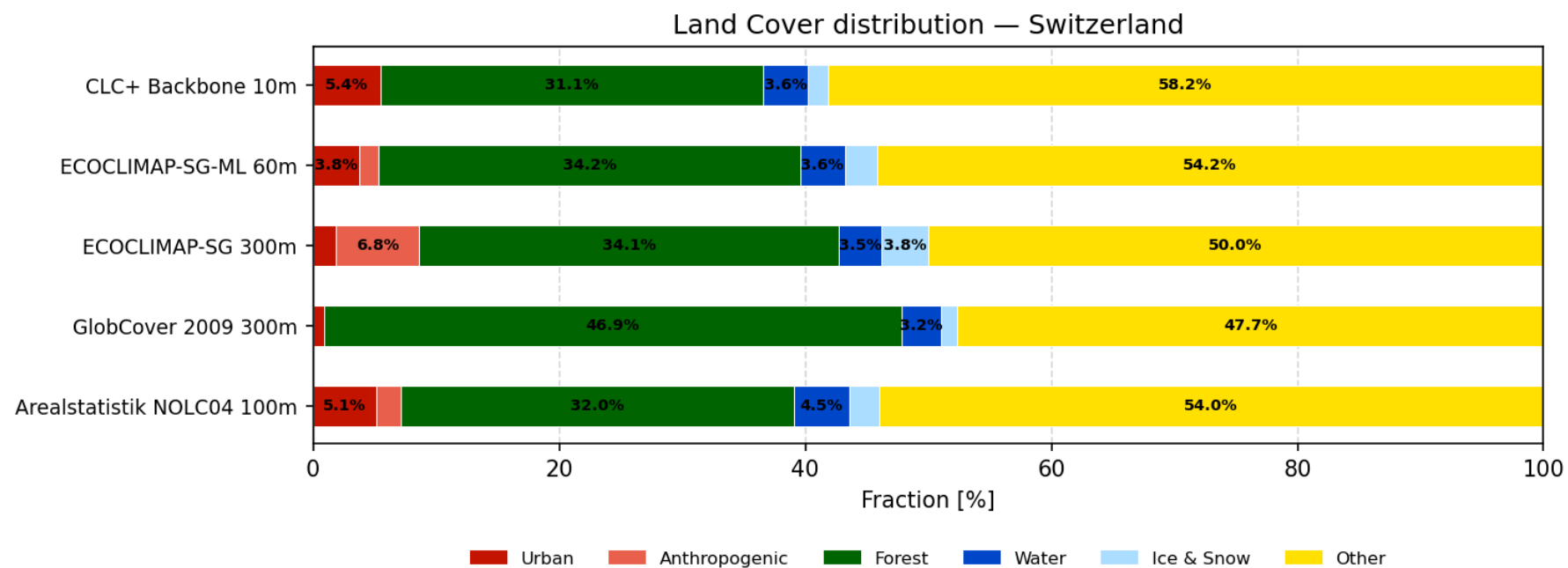
Reference



GlobCover2009

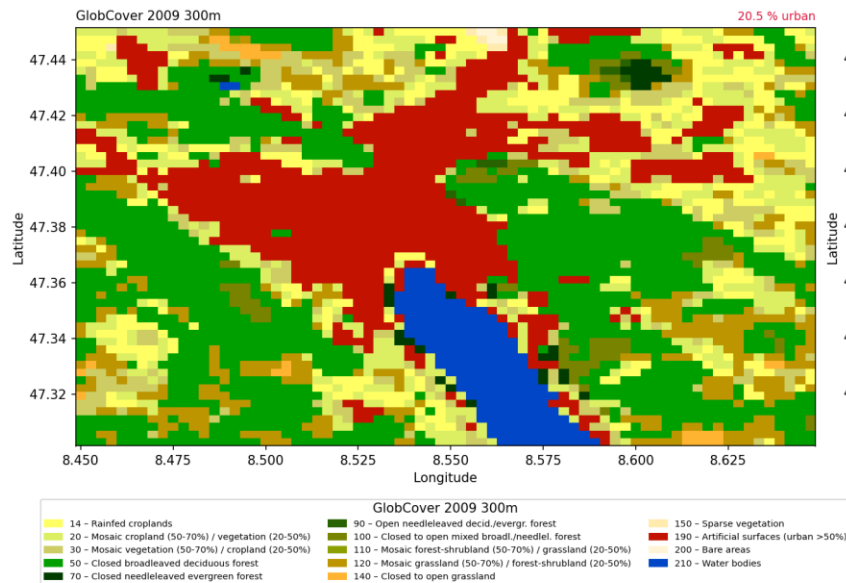


# Land-Cover Datasets Comparison

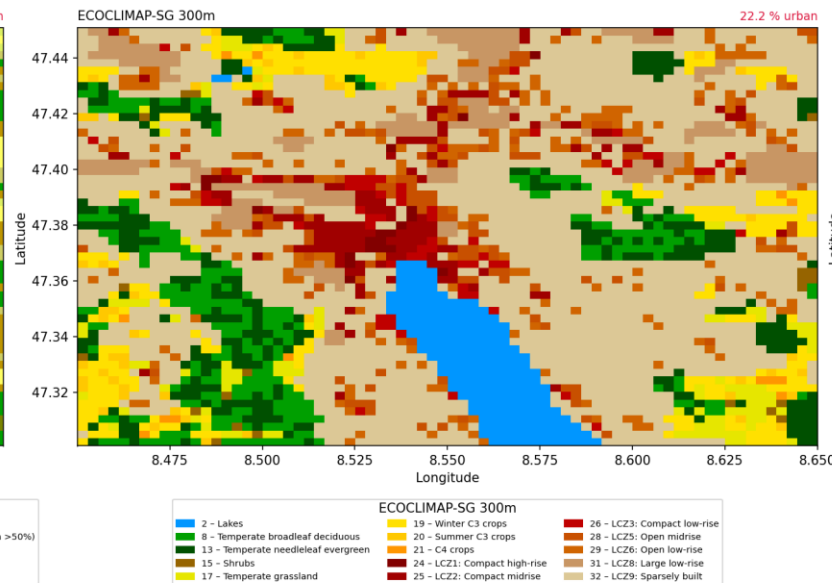


# Combining GlobCover2009 & ECO-SG-ML

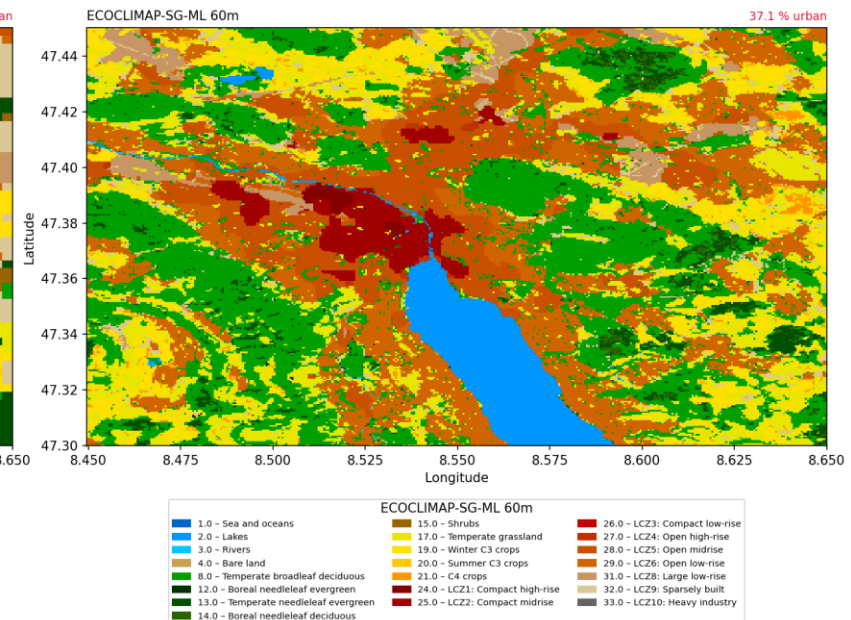
GlobCover2009



ECO-SG



ECO-SG-ML

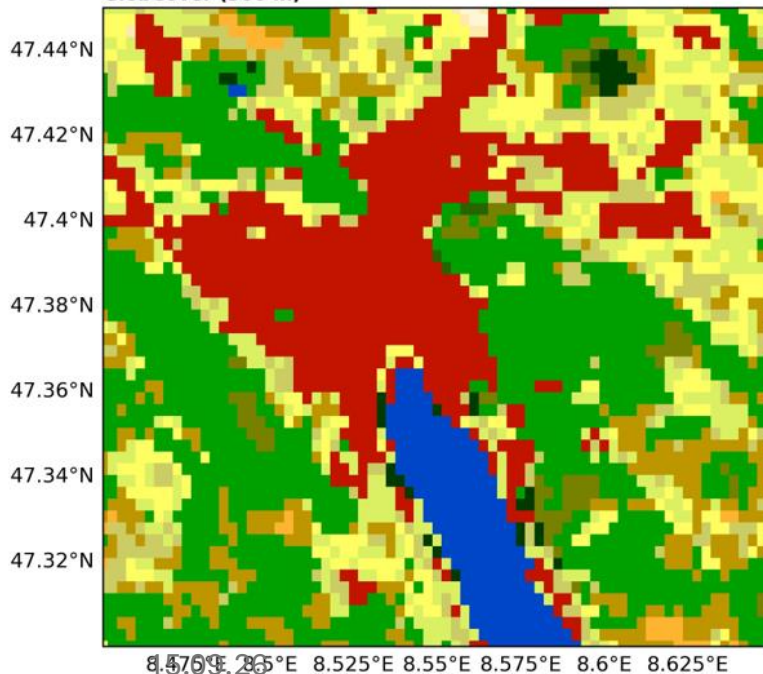


- Collapse GlobCover2009 to primary labels
- Find for every ECO-SG-ML 60 m pixel closest GlobCover pixel with same primary label and use the secondary GlobCover label for this pixel
- Urban areas: Keep ECOCLIMAP LCZ (variable classes)

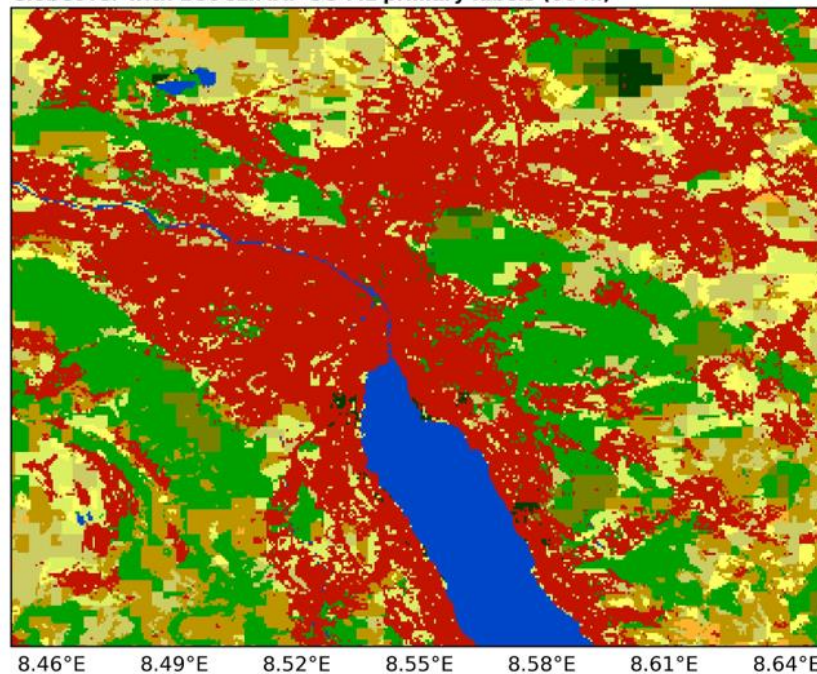
# Globcover+ECO (60m)



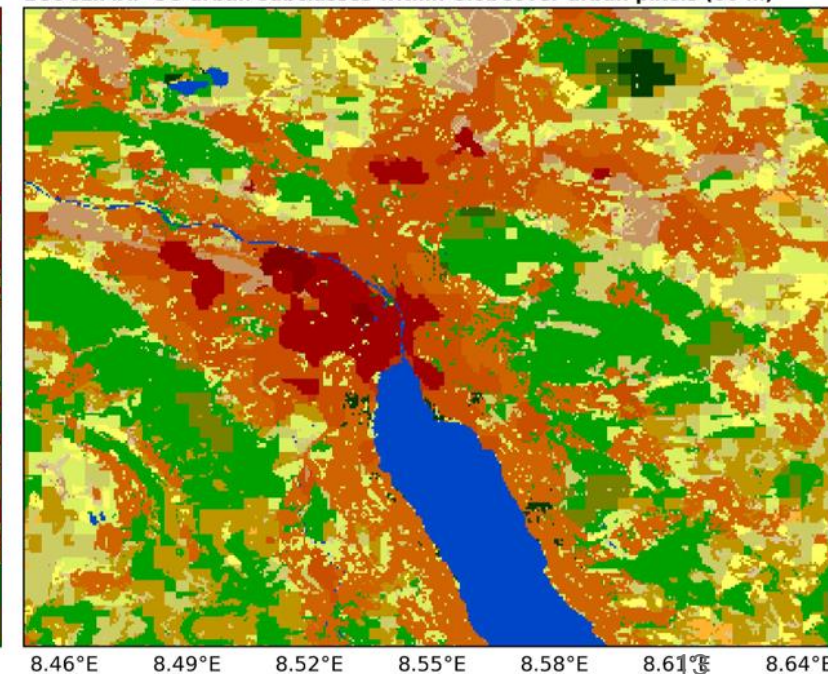
GlobCover (300 m)



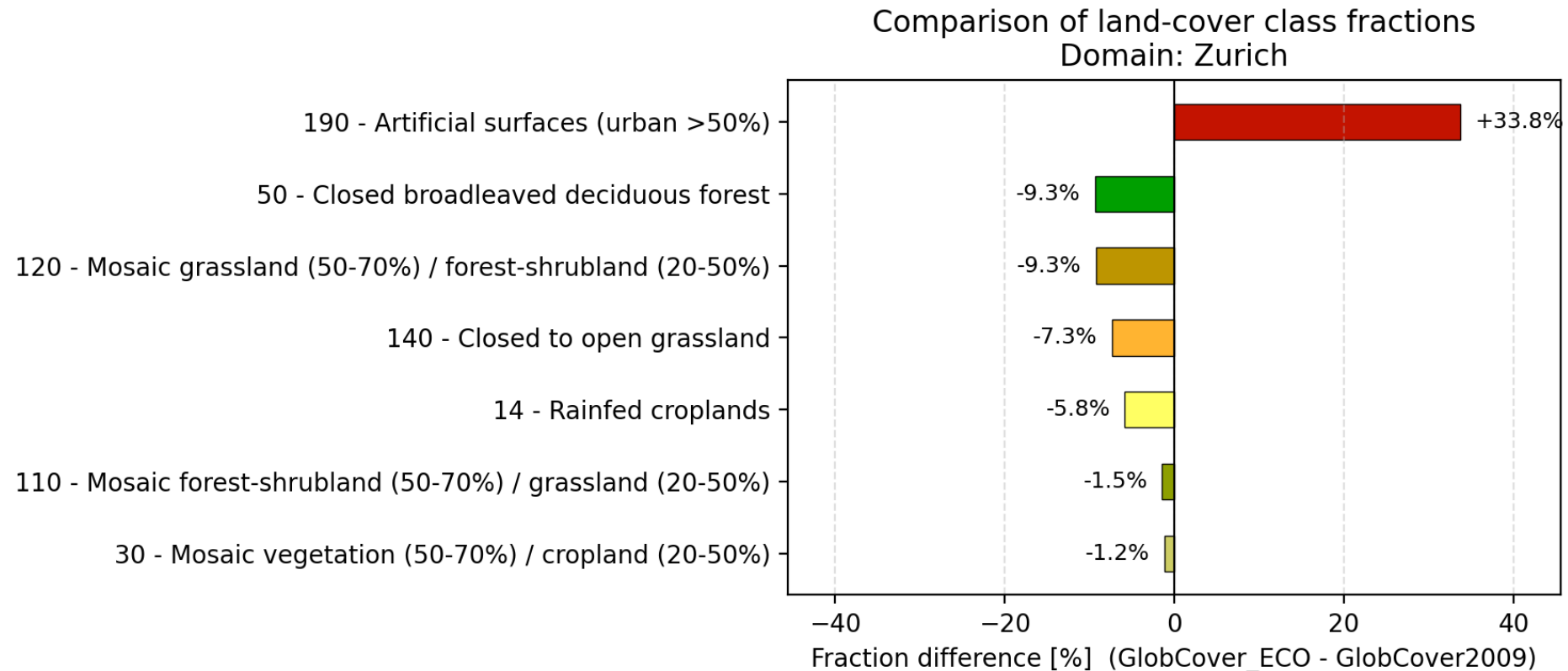
GlobCover with ECOCLIMAP-SG-ML primary labels (60 m)



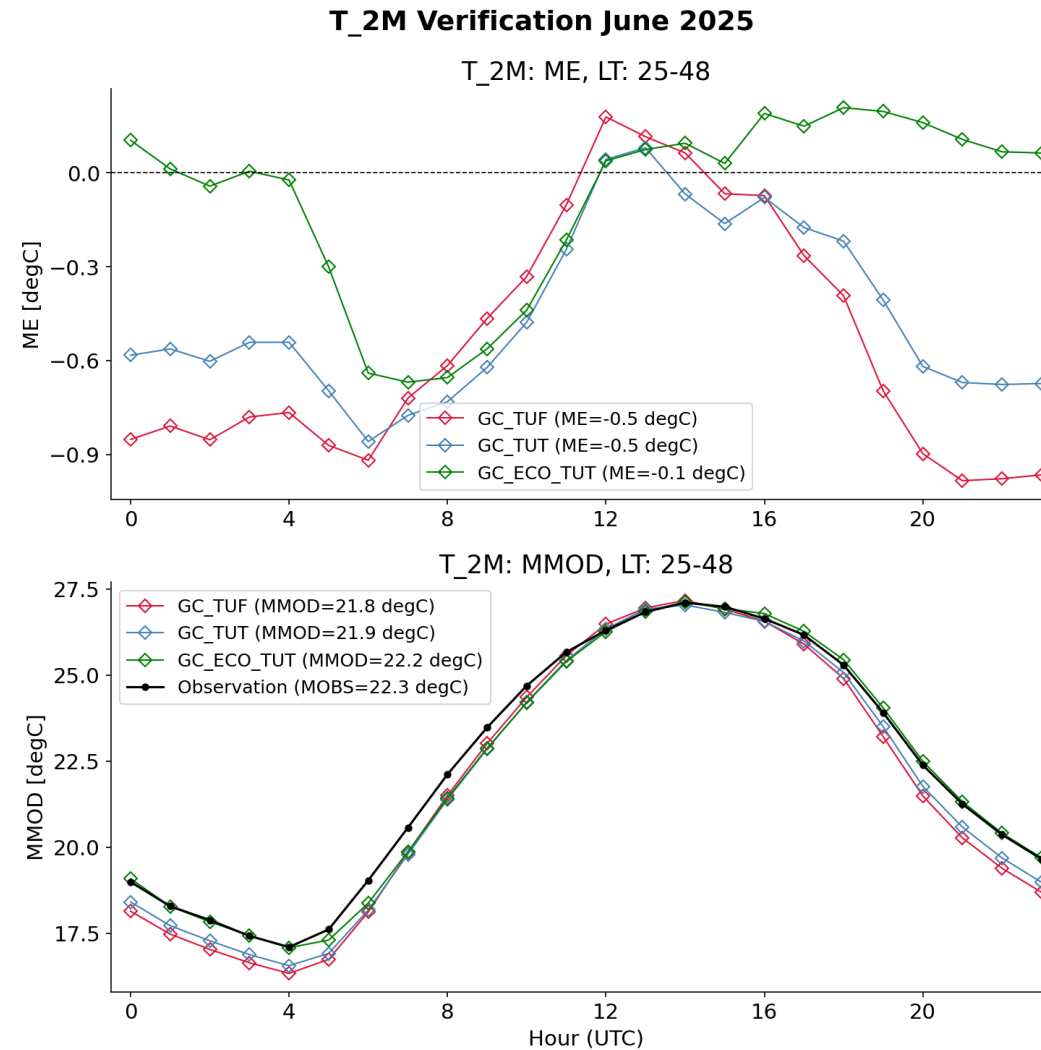
ECOCLIMAP-SG urban subclasses within GlobCover urban pixels (60 m)



# Land-Cover classes comparison



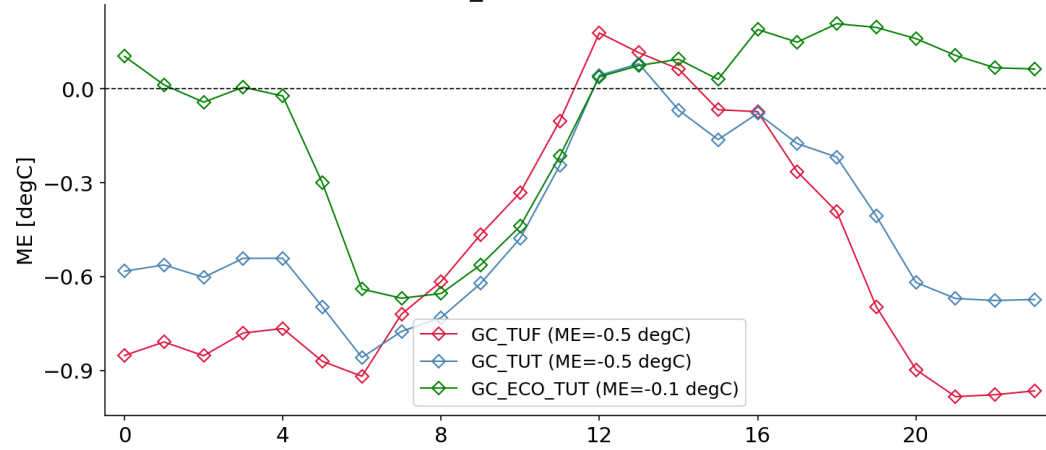
# Verification with urban Station Data



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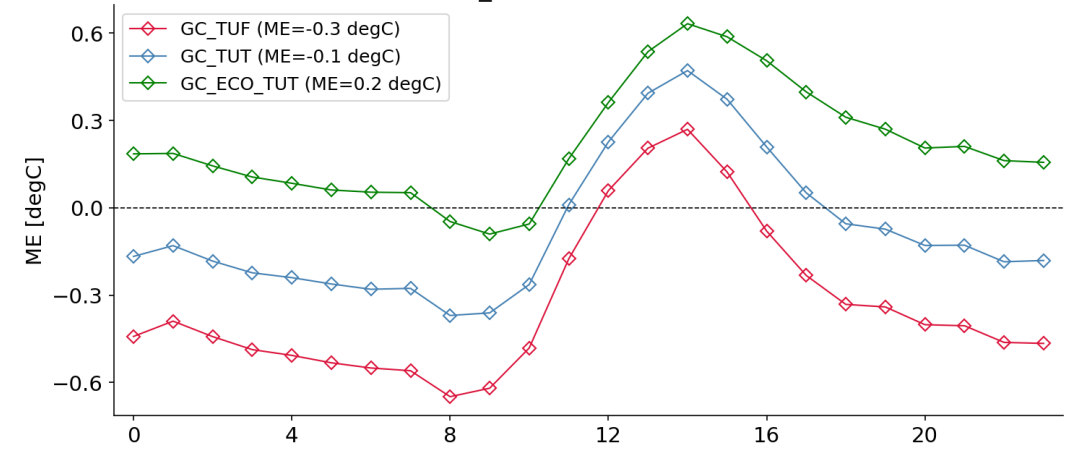
**T<sub>2M</sub> Verification June 2025**

T<sub>2M</sub>: ME, LT: 25-48

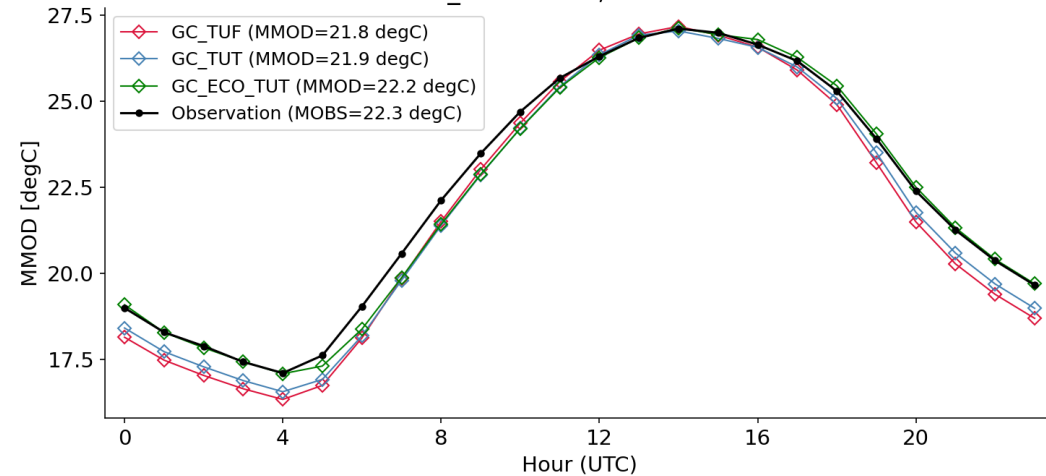


**T<sub>2M</sub> Verification January 2025**

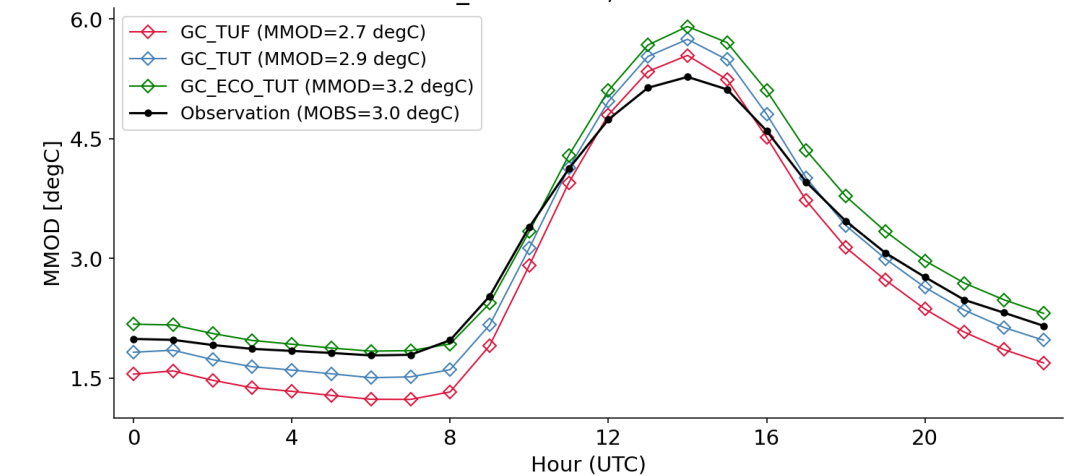
T<sub>2M</sub>: ME, LT: 25-48



T<sub>2M</sub>: MMOD, LT: 25-48



T<sub>2M</sub>: MMOD, LT: 25-48





Thank you

