

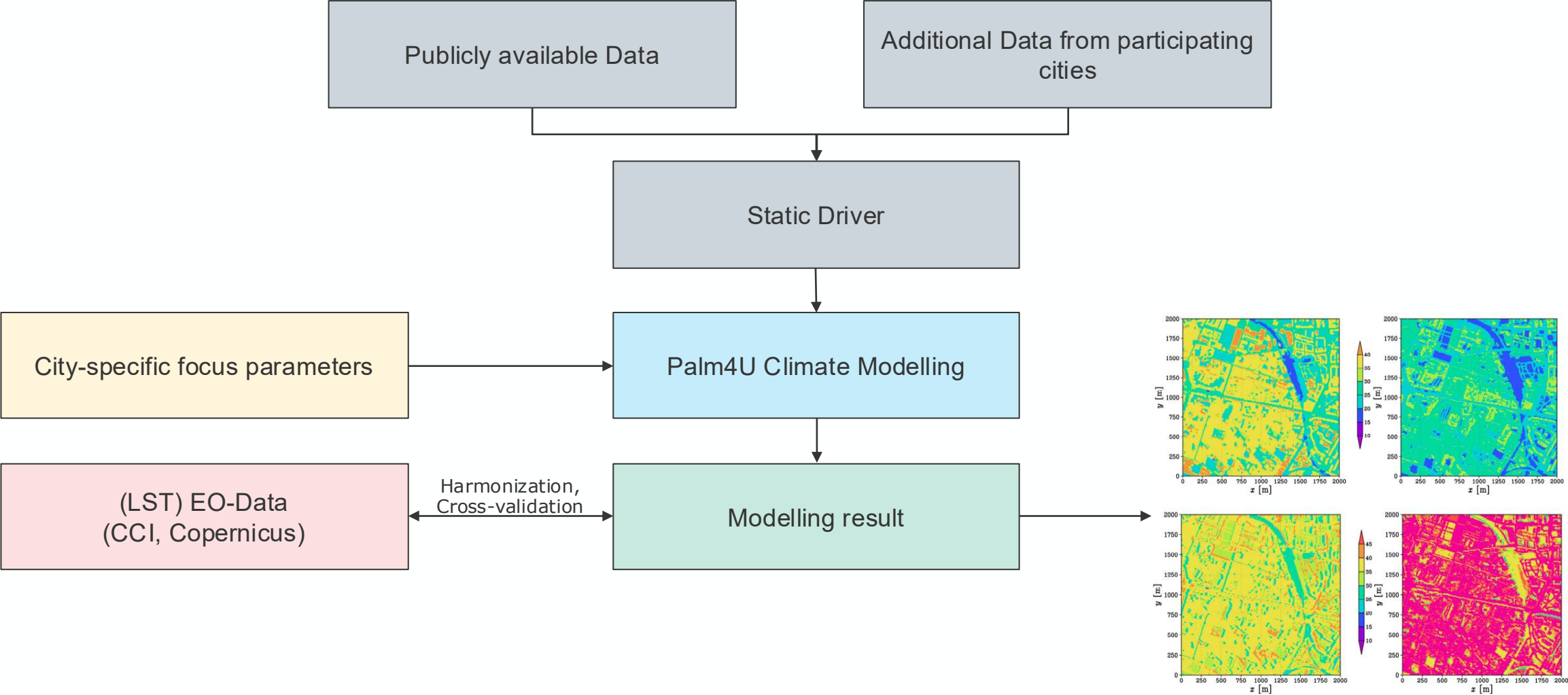
EO4UrbanClimate

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23/03/2026

- Origin: ESA Climate Space / CCI EXPRO+ activity
- Project Partners: OHB & GERICS
- Duration: ~18 months (Sep 2025 – Mar 2027)
- Objective: Assessment of *scientific feasibility* and demonstration of integrating *EO climate datasets with urban climate modelling* to improve *heat risk assessment* and evaluate *adaptation and mitigation strategies at city scale* Context &
- Supports:
 - Urban climate adaptation & resilience planning
 - ESA CCI programme
 - IPCC risk framework
- Strong interaction with:
 - Stakeholder cities: Essen (DE) · Konstanz (DE) · Bergen (NO) · Šiauliai (LT) · Thessaloniki (GR) · Johannesburg (ZA) · Auckland (NZ) · Porto Allegre (BR)
 - CCI ECV teams (esp. LST)

Skeleton overview of the approach

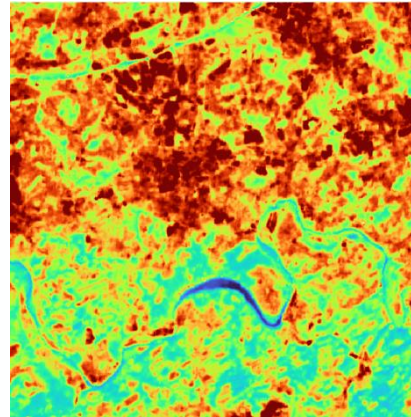


ECVs & further Data being used



Primary ECV: LST. Dataset sources:

- ESA CCI LST data products
- OHB downscaled Sentinel-3 LST
- Landsat 8/9 LST



Landsat 8/9 LST

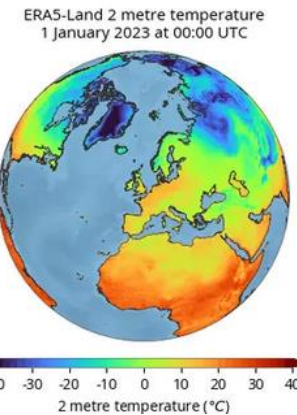


ESA CCI Land Cover



Dynamic Drivers

- ERA5 Reanalysis
- High resolution (regional) climate model data



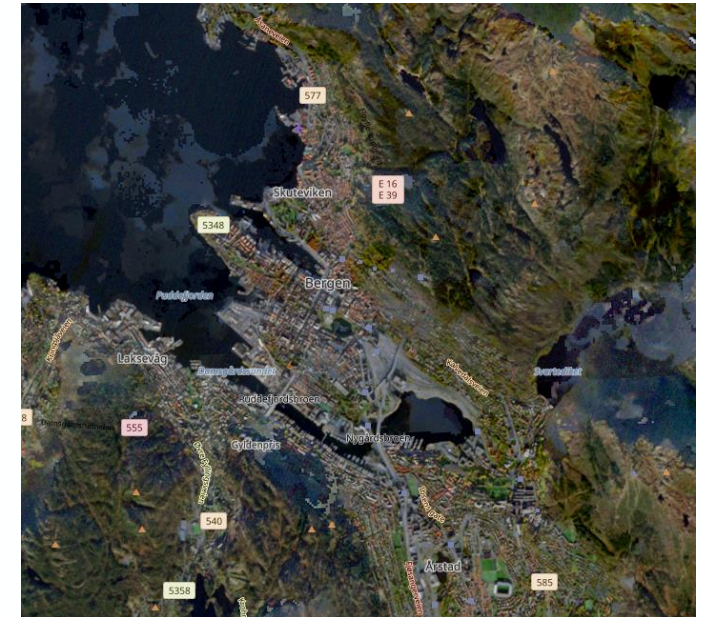
ERA5-Land 2 metre temperature
1 January 2023 at 00:00 UTC

2 metre temperature (°C)



Additional dataset sources for contextual information and auxiliary input for LST downscaling

- ESA Climate Change Initiative: (High Resolution) Land Cover, Vegetation, Soil Moisture, Biomass, Cloud, Sea Surface Temperature
- Sentinel-2 multispectral optical imagery



- Primary ECV: Land Surface Temperature (LST)
 - Why LST?
 - Direct proxy for urban heat hazard
 - Core variable for urban heat island analysis
 - Strong relevance for climate adaptation
 - Strengths
 - Global coverage
 - Long-term consistency
 - Physically meaningful for heat assessment
 - Limitations
 - Spatial resolution (native km-scale)
 - Temporal gaps (clouds, revisit)
 - Urban complexity not fully captured
 - Wish List
 - Higher spatial resolution (≤ 100 m operational)
 - Improved temporal continuity
 - Direct cross-validation with urban modelling results

Current Status (early phase)

- Science requirements & dataset inventory completed
- Stakeholder cities onboarded and data collection ongoing
- Engagement with CCI LST team initiated

Emerging Insights

- Strong need for:
 - Downscaling approaches for urban applications
 - Closer coupling between EO and urban climate models

Relevance to CCI

- Demonstrates:
 - How CCI datasets can be used in city-scale applications
 - Requirements for next-generation CCI products
- Provides feedback loop to improve usability of CCI datasets in applied contexts

Planned Outputs

- Contribution to scientific publications (e.g. IPCC Special Report on Climate Change and Cities 2027)
- Open datasets / methods
- Roadmap towards operational urban climate services