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Description

To guide climate change adaptation and mitigation, reliable information on the regional and local impacts of climate change is needed. The Destination Earth (DestinE) initiative responds to this need by developing Digital Twins (DTs) of the Earth. In particular, DestinE Climate DT provides climate information at regional and local scales over multiple decades. However, the reliability of the impact assessments of Climate DT depends on the underlying km-scale climate models, which fail to represent some key components of the Earth system.

We aim to enhance the DestinE infrastructure by developing a Digital Twin of the Earth system for the cryosphere, land surface and related interactions (TerraDT). TerraDT subscribes to the DestinE vision of building interoperable and interactive DTs, while pushing the resolution to km-scale, globally. TerraDT improves the descriptions of Earth system components in the DestinE climate models forland ice, sea ice, aerosols and land surface.

TerraDT is based on a modular infrastructure with a coupling interface that enables adding new components or AI/ML-based emulators. TerraDT also develops impact models linked to the cryosphere and land surface to provide user-relevant information with interactive capabilities. TerraDT developments enable their full integration to the DestinE framework.

Overall, TerraDT will improve the reliability and relevance of the climate projections and impact assessments of DestinE, which is critical for guiding adaptation and mitigation actions. The TerraDT consortium consists of 18 organisations with expertise in Earth system modeling, supercomputing and impact assessments. TerraDT will also engage with relevant users and stakeholders. The consortium includes the key partners from the DestinE Climate DT contract team. Thus, it is in a unique position to fully exploit the novel approach of Climate DT and furtherenhance its capabilities by integration of the TerraDT developments.

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