EarthKnowledge
INTEGRATED PLANETARY INTELLIGENCE™

Microsoft Partner
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Modeling complex system-subsystem interactions on a planetary scale

About the Earth Knowledge Integrated Planetary Intelligence® Platform

The cascading impacts of climate change are challenging the validity of existing data models. Why? Traditional data models estimate the likelihood of specific events occurring in isolation, based on a small set of inputs (e.g., flood). However, our planet is a complex and interrelated system of interactive subsystems, where each part influences the others.

To accurately forecast global change, new data approaches are required to incorporate the interactions and feedback loops that exist among the Earth's various components. At Earth Knowledge, we've spent over 20 years developing a comprehensive digital twin of our planet that considers its numerous systems and subsystems.

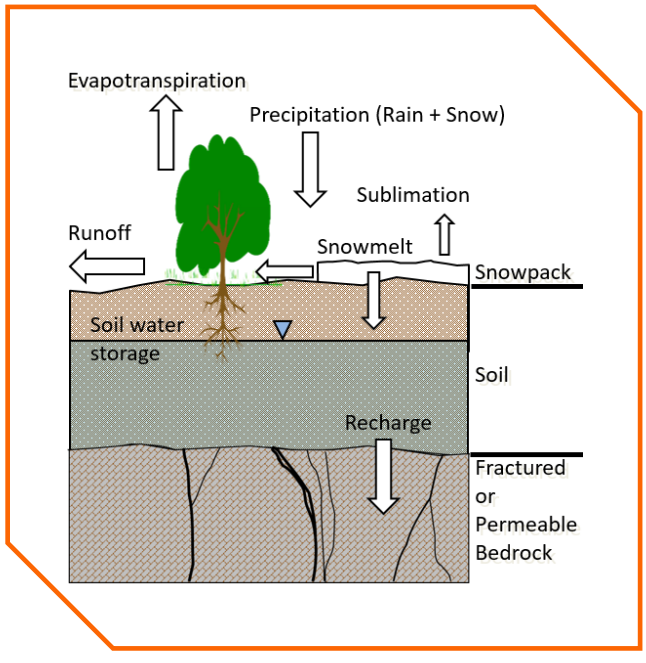
This proprietary data science approach allows us to create a more accurate and holistic representation of all the Earth's climate, natural and anthropogenic systems.

The result: **Integrated Planetary Intelligence®**

System of systems approach in action

By integrated systematic Earth science processes, the Earth Knowledge Integrated Planetary Intelligence® Platform can model and forecast complex climate and nature-dependent interactions, including potential human responses with higher accuracy.

For example, to accurately assess flood potential, the platform considers the interplay between precipitation, soil, geology, recharge, biomass, evapotranspiration and suite of interconnected Earth systems to provide a calculated exposure index.



Earth Knowledge
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Data Highlights

Continuous validation

The “system of systems” approach sets a new standard for predictive modeling to characterize past, present, and potential alternative future environmental processes and conditions. Some of these processes are enhanced with Artificial Intelligence (AI) and Machine Learning (ML). Our Science Council follows a robust curation process and principles to ensure that the highest quality Earth systems models are incorporated into our platform.

The digital twin is calibrated and evaluated to determine how well it represented natural conditions over the 125-year historical period.

Massive Scale

Our Digital Twin contains over 70 billion cells and 100 petabytes of global geospatial data describing characteristics of both landscapes and seascapes at many spatial and temporal resolutions. Our Science Council has developed a comprehensive set of more than 50 proprietary indicators of the key drivers of global change aligned to the IPBES (Intergovernmental Panel on Biodiversity & Ecosystem Services.

Comprehensive array of datasets, models and parameters

Across our four (4) Earth system spheres: atmosphere, biosphere, geosphere and hydrosphere, Earth Knowledge utilizes hundreds of peer-reviewed datasets, models and parameters to produce over 50 key exposure indexes. The hydrosphere model is represented below.

Data Sets	Parameters	Models	Themes / Indicators
WWF HydroSHEDS, ATLAS, BASINS	Runoff	Basin Characterization Model v8.0	Ocean (Ocean Acidification, Coastal erosion, Saline intrusion, Wetland inundation, Ocean warming, Estuary alteration)
US National Water Model	Potential Evapotranspiration	PARFLOW	Ice Caps / Glaciers
Global Marine Environment Dataset (GMED v2.0)	Climatic Water Deficit	SHETRAN	Ground Water
Ecological Marine Units (EMU) in 3D	Groundwater Recharge	MIKE SHE	Surface Water (base flow, flooding, sediment load)
Global International Waters Assessment Database (GIWA)	Temp (Min/Max)	SWMM	Water Quality
Global Wetlands Data	Precipitation	SWAT	Permafrost
	Soil Permeability	MODFLOW	
	Base Flow	HydroGeoSphere	
	Land Cover / Vegetation Type		

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