OAK RIDGE NATIONAL LABORATORY

AI-driven Gravity Maps

Unprecedented resolution of global gravity anomaly maps

Demonstrate the possibility of producing high-resolution gravity maps on a global scale with consistently reliable quality at reduced cost and effort.

CHALLENGE

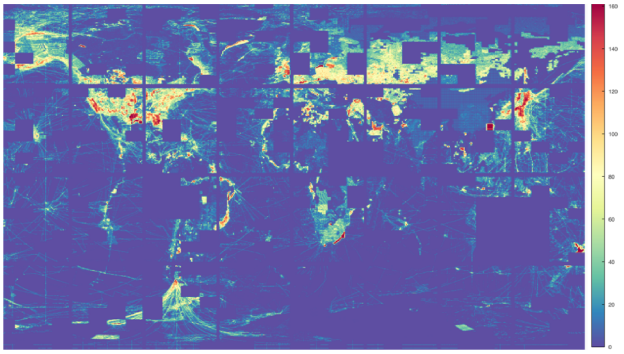
Current gravity mapping techniques are financially inefficient and produce inconsistent data quality. Geoscience research needs a global scale gravity map with consistent resolution and reliable quality.

APPROACH

- Artificial intelligence (AI) enables deep feature mapping that learns nonlinear relationships between endpoints of interest and complex key inputs.
- For AI-driven gravity maps, deep neural networks can learn the relationship between critical geophysical variables.

IMPACT

- Uncovering complex relationships between various geological, topological, and density patterns
- High-resolution gravity maps to support accurate inertial navigation systems
- Early detection of earthquake activity for natural disaster preparedness
- High temporal gravity anomaly monitoring



Sample density map: High-res gravity maps are essential to geophysics and geoscience.

Research Focus

ORNL is developing an AI-driven approach to derive planet-scale gravity mapping across diverse geophysical and topographical conditions.

- Artificial intelligence
- Geophysics
- Deep feature mapping

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