Global bathymetry prediction using deep neural networks

Hugh Harper and David Sandwell

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* at 15s resolution **and publicly available Mayer et al. (2018)

anomalies, changes height of geoid

Sparse depth soundings



Global free air anomaly



Global predicted depth



Description of data

Depth measurements

- raw depth measurements are median reduced to 1 minute resolution and gridded -> 50 million points
- longitude, latitude, depth

Global free air anomaly

- 1 minute resolution
- grid can be sampled by (longitude, latitude) of depths
- (true for any global grid, but resolutions may differ)





a)

30°

0°

-30°

-60

Filtering gravity and depth

Constrained absolute depths

5

Free air anomaly

Filtering gravity and depth

Constrained, filtered depths

Filtered gravity anomaly

Nettleton (Old)

Harper and Sandwell (2023)

DNN prediction

DNN prediction

DNN prediction + Low pass filter

Comparison of model misfits

Improving depth predictions — going forward

- Increased coverage of depth soundings
- Higher resolution predictions limited by resolution of gravity
- Focus on coastal areas

