

GGOS

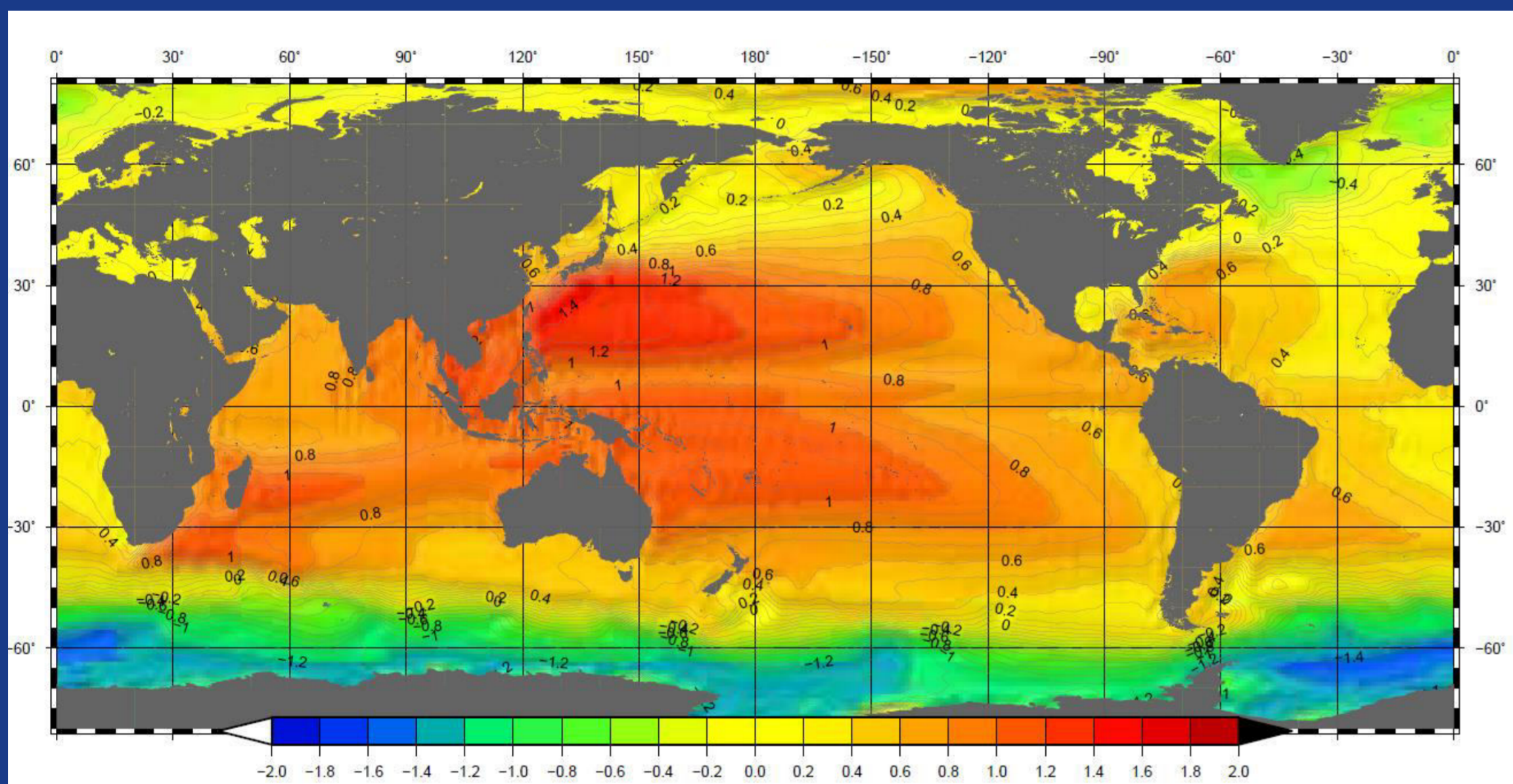
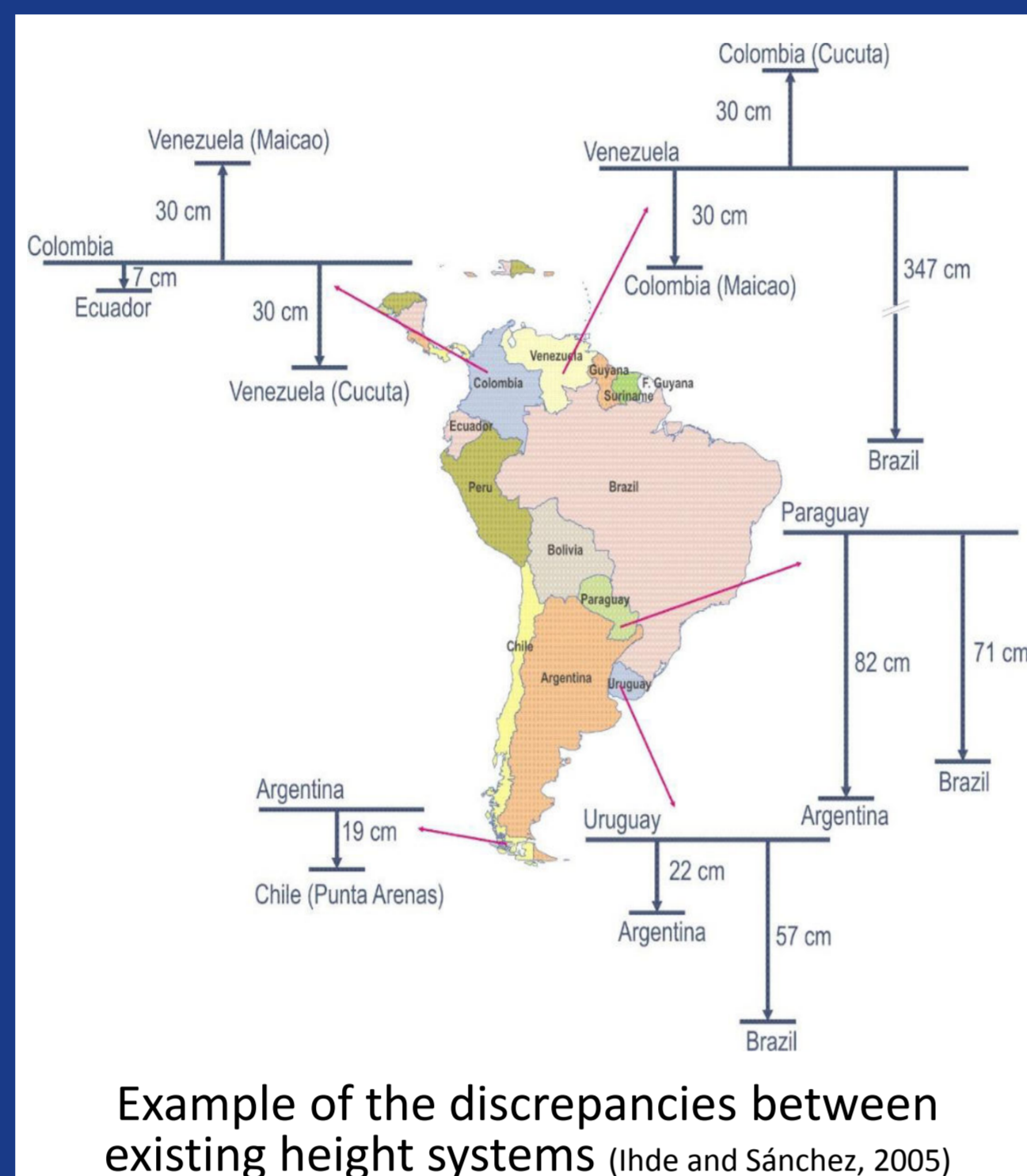
GLOBAL
GEODETIC
OBSERVING
SYSTEM



Focus Area Unified Height System

Heights referring to the mean sea level

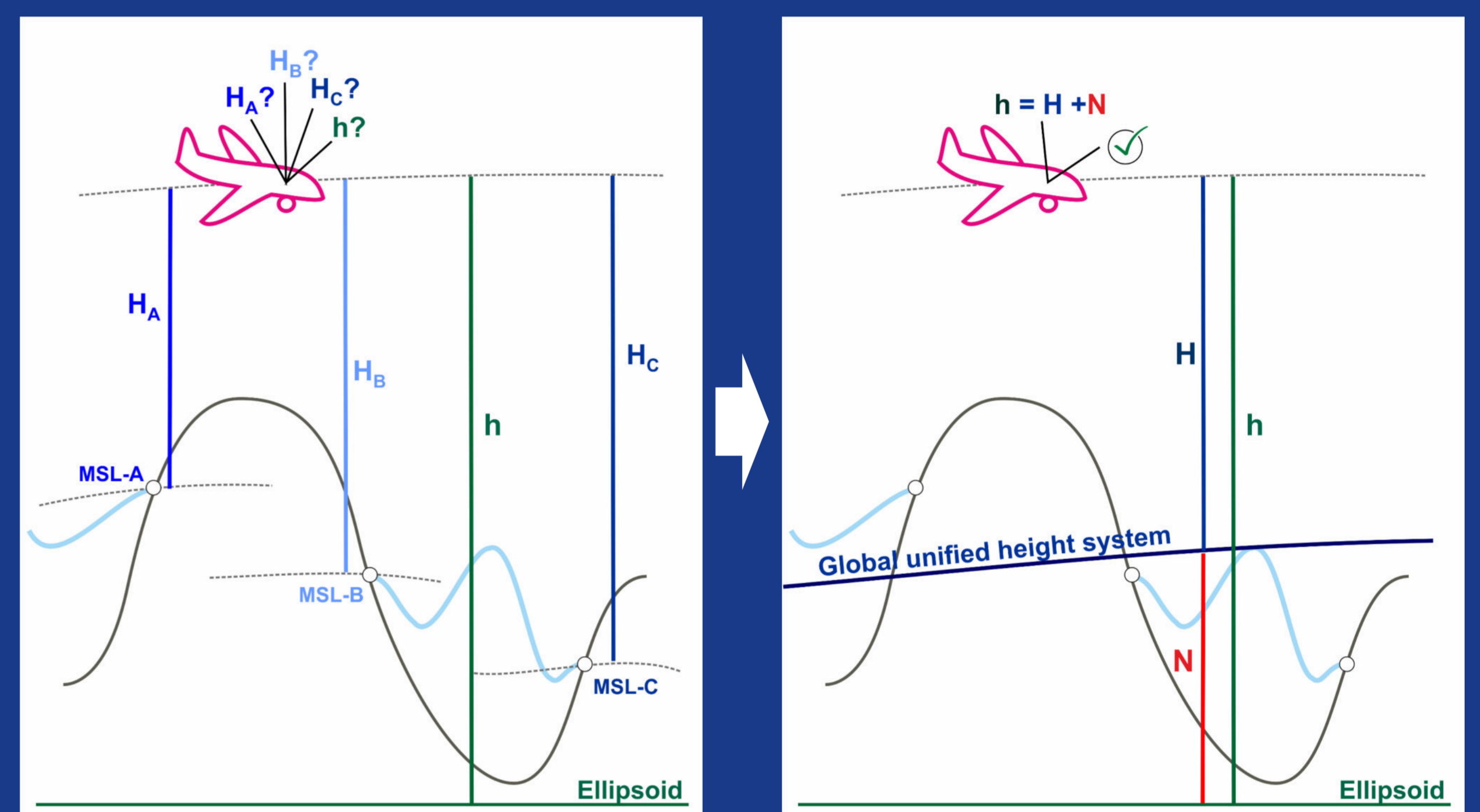
Heights (altitudes or elevations) traditionally refer to the mean sea level determined at tide gauges. As the sea surface has slight hills and valleys in it (similar to the topographic surface although much smoother), the mean sea level may be closer to or farther from the centre of the Earth depending on the location. Thus, the zero elevation as defined by one country differs up to ± 2 metres from the zero elevation as defined by other country.



Topography of the mean sea surface in metres (©DGFI-TUM)

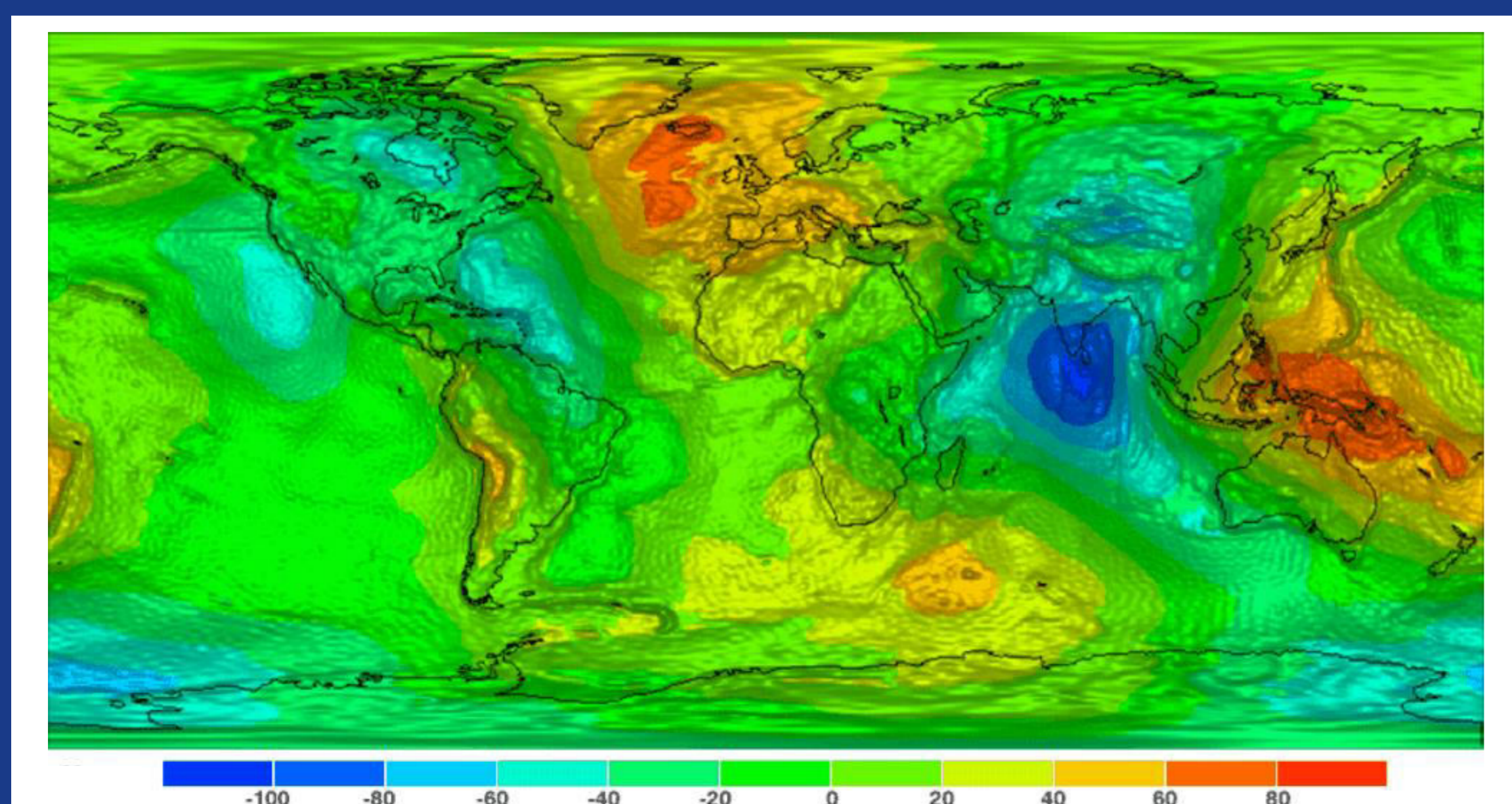
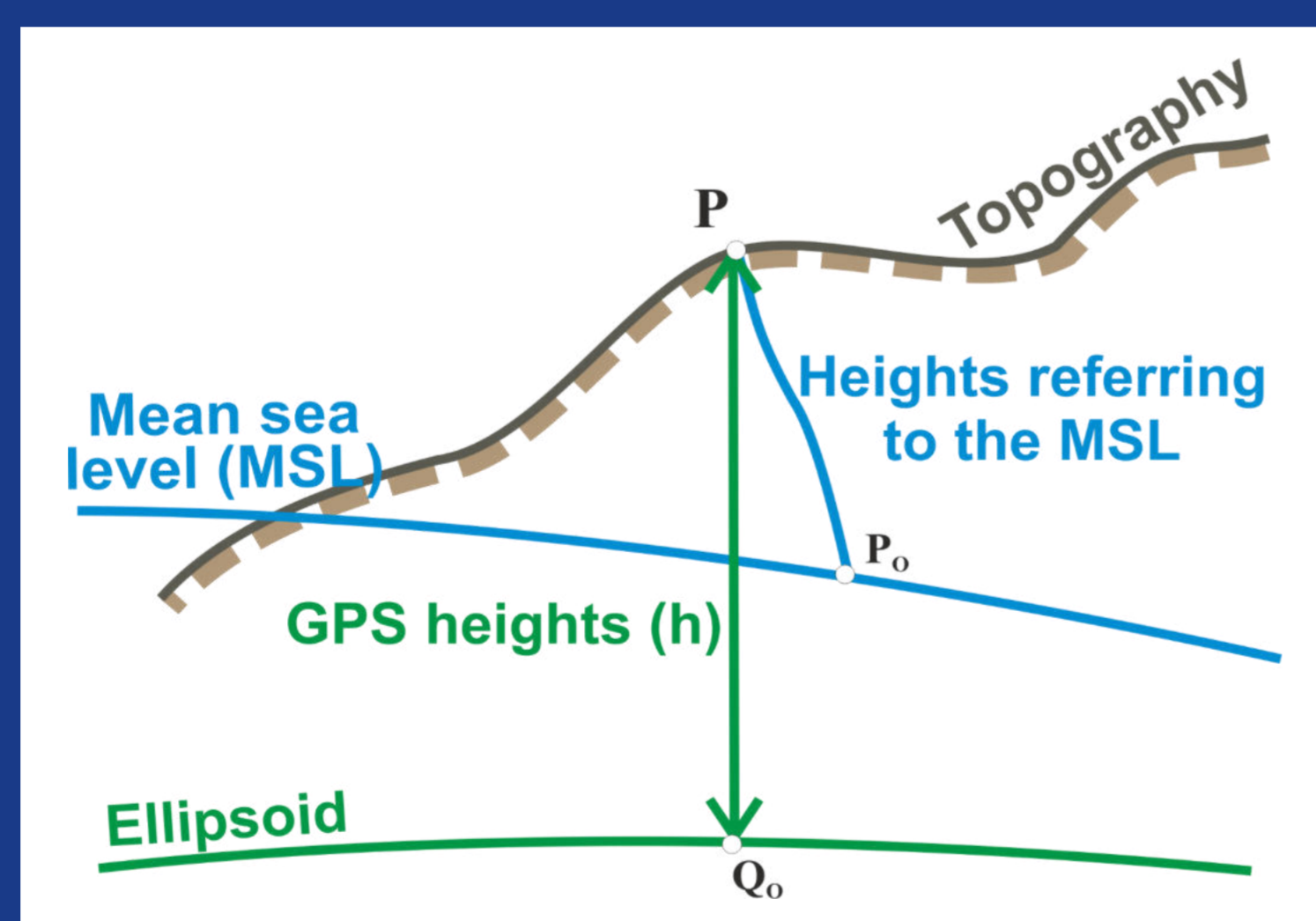
Heights must be consistent worldwide

The state-of-the-art demands an accurate knowledge of the inconsistencies existing between the different heights. For instance, airplanes are equipped with barometers and GPS navigation systems. Heights provided by the barometric instruments refer to the mean sea level. Heights provided by the GPS refer to the ellipsoid. An airplane approaching for landing, having the wrong height information, can have terrible consequences.



Heights with the Global Positioning System (GPS)

A variety of techniques and equipment are used in practice to measure heights. However, there is no guarantee that each technique will produce the same height. For instance, heights determined with GPS do not refer to the mean sea surface, but to a geometry model of the Earth called ellipsoid (a flattened sphere). Differences between GPS heights and those referring to the mean sea surface may reach up to ± 100 m.

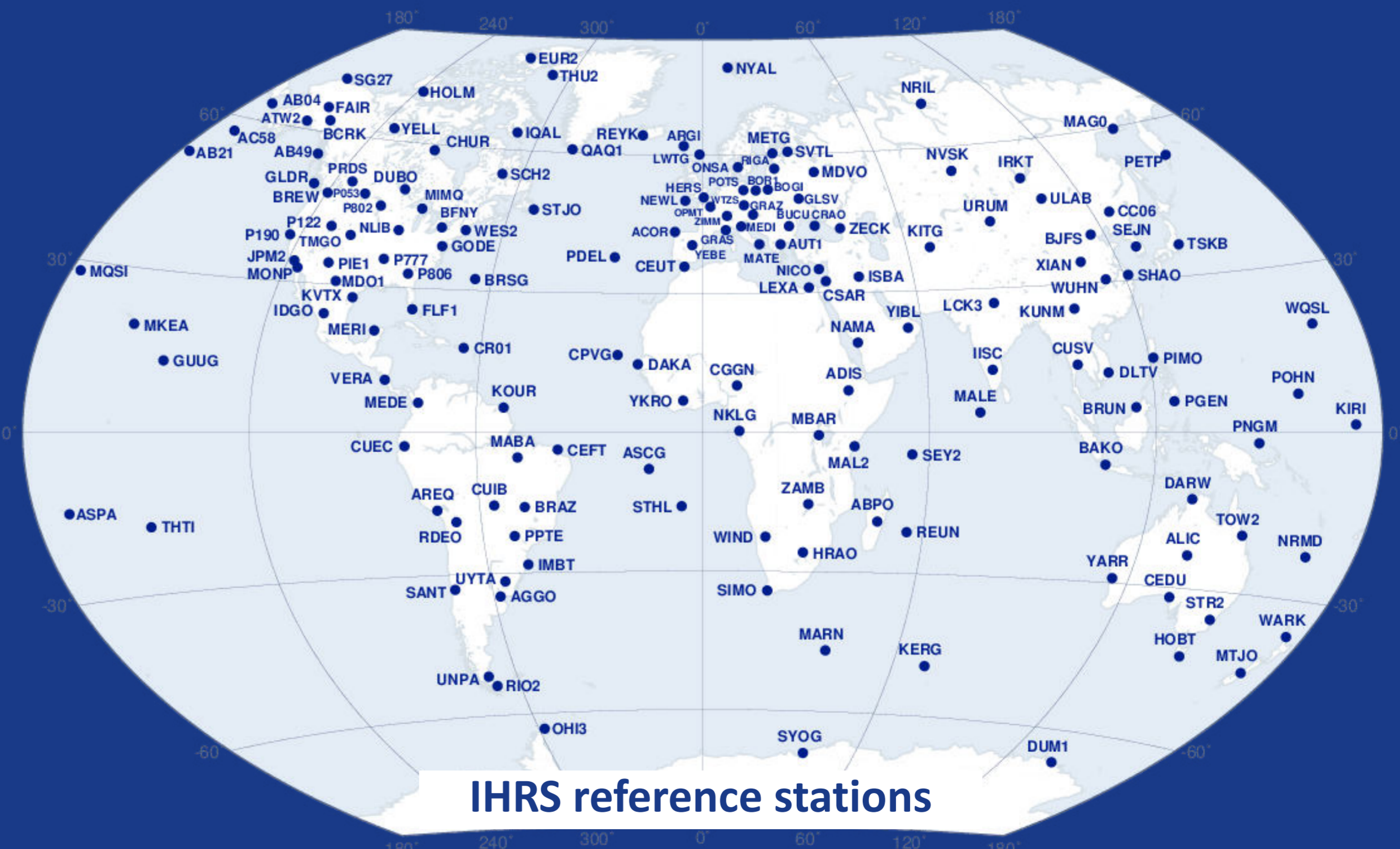


Differences in metres between GPS heights and heights referring to mean sea level (©ESA)

International Height Reference System (IHR)

A unified height reference system is required

- To refer all existing heights to one and the same reference surface. This is the only way to ensure global consistency between heights.
- To combine existing heights with modern navigation techniques like GPS. This will support the implementation of trans-national projects related to engineering, navigation, infrastructure development, etc.
- To assess global change effects in a worldwide-frame; for instance sea-level rise, flooding risks, reduction of hydrological resources, etc.
- More information at <http://ihrs.dgfi.tum.de>, www.ggos.org



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