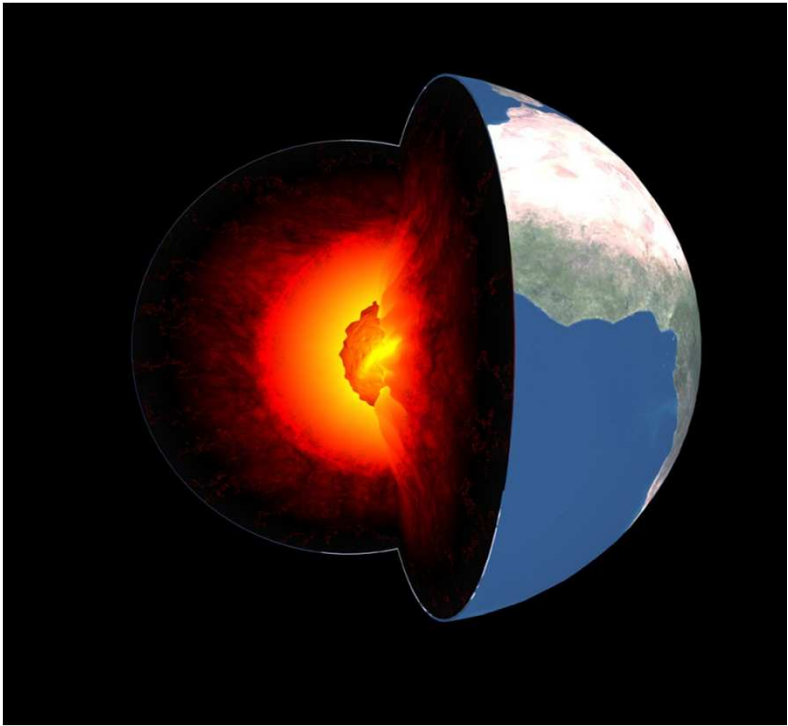
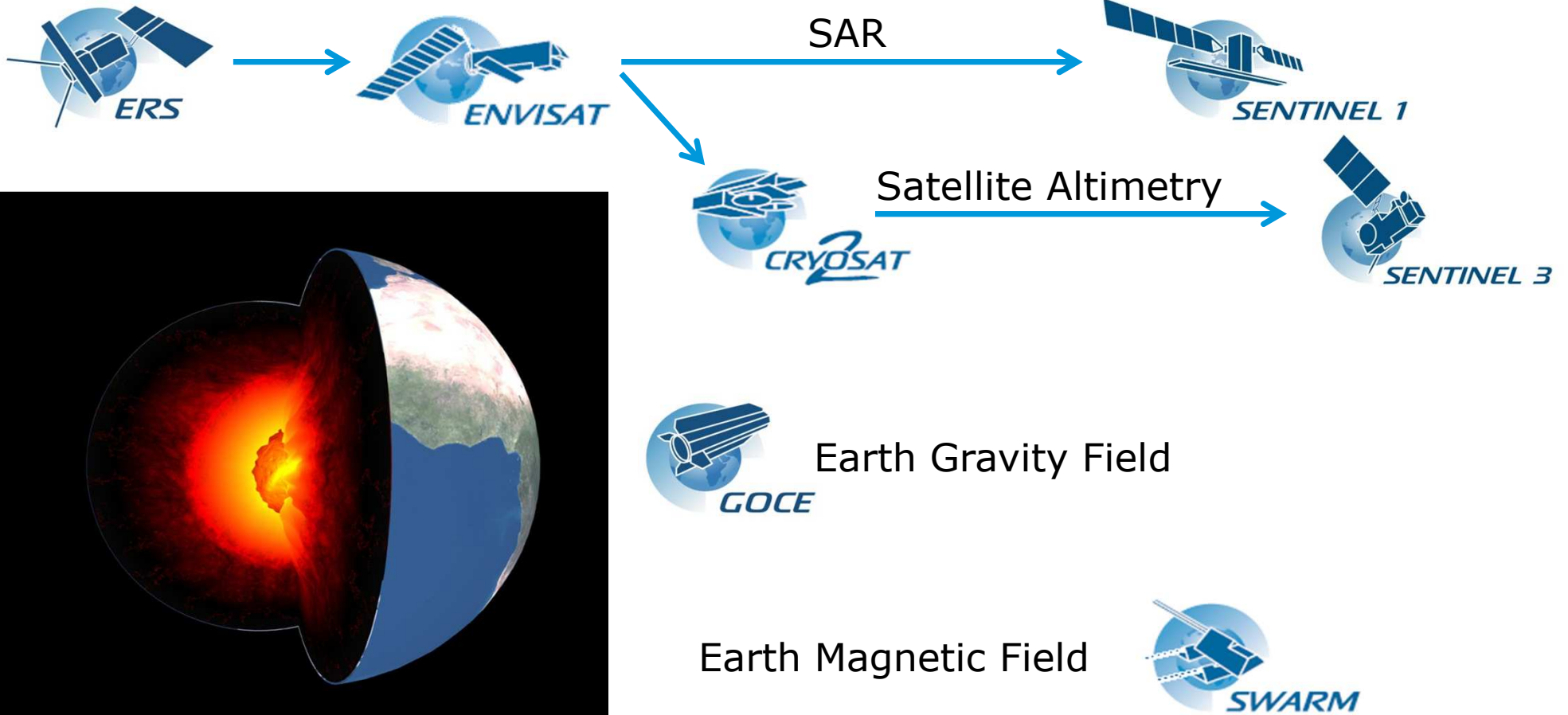


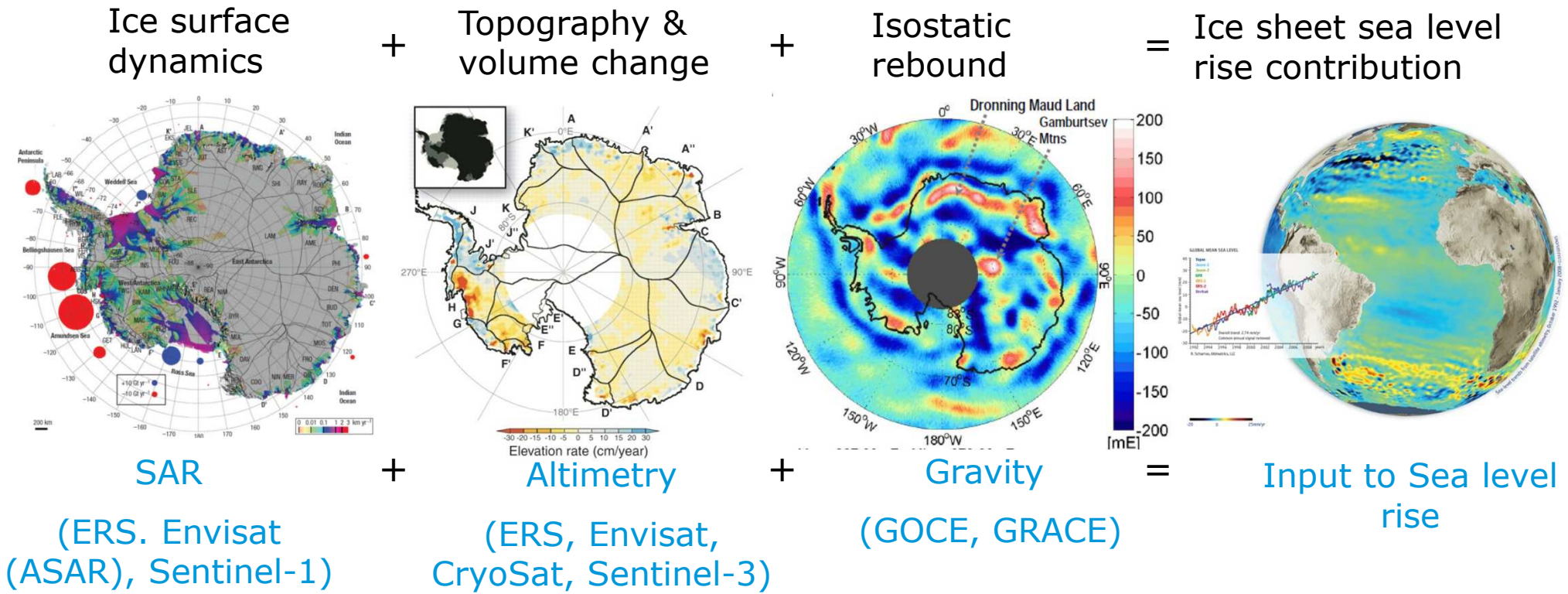
GOCE Solid Earth Workshop Introduction

Roger Haagmans
Enschede, NL
16/10/2012

ESA's Solid Earth Toolkit



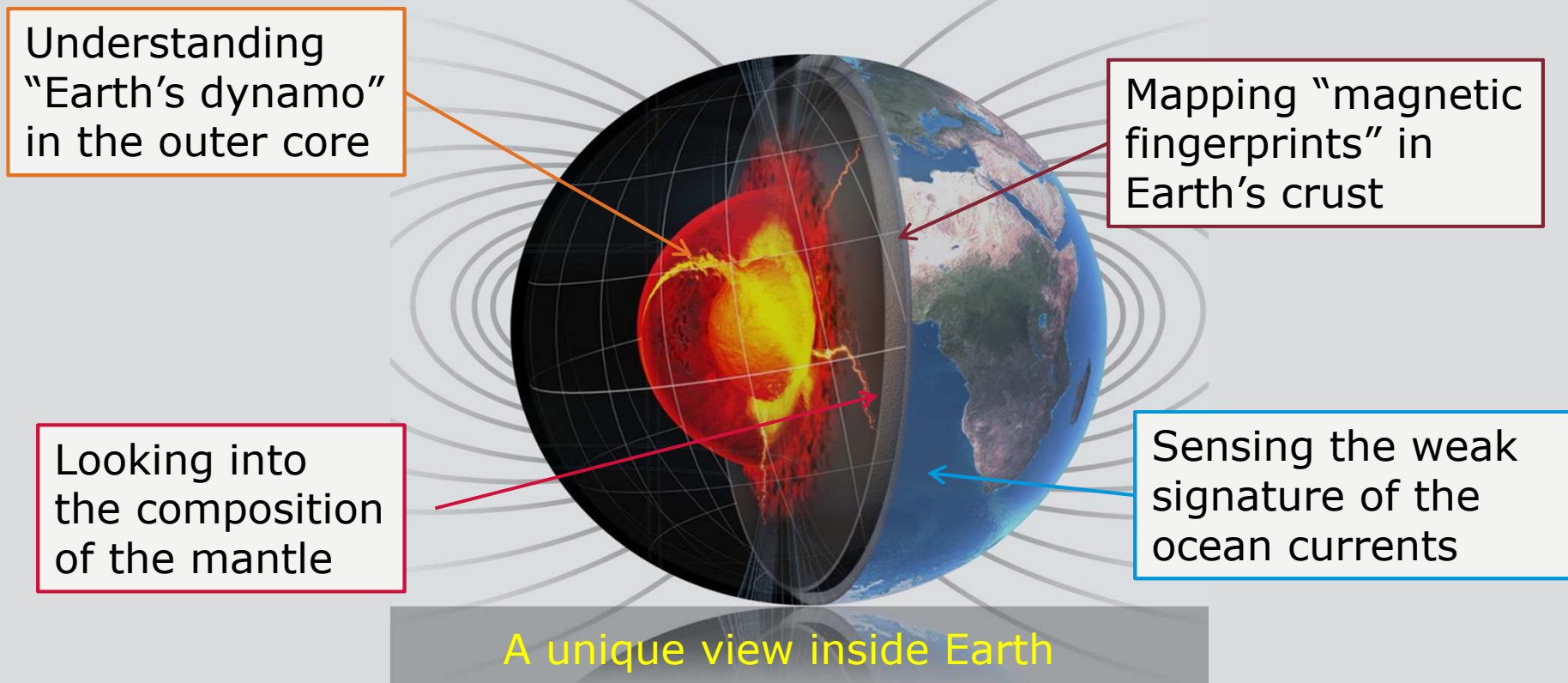
Ice Sheet contribution to Sea Level Rise:



Swarm: revealing Earth's inner secrets



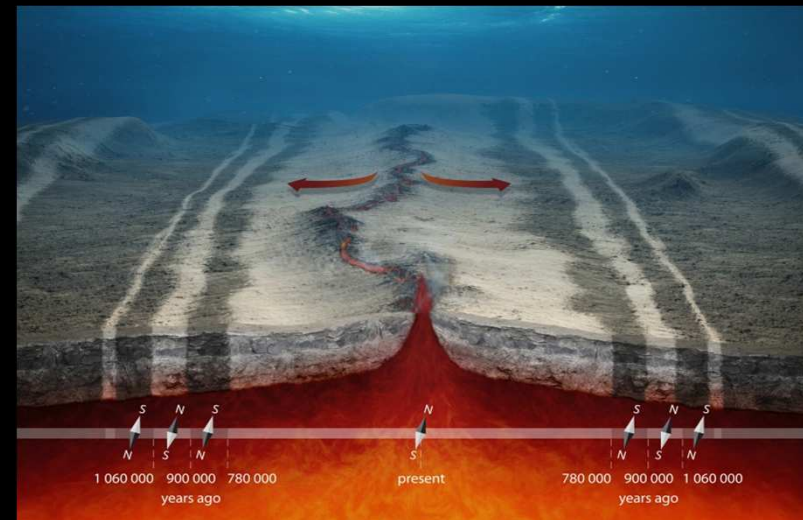
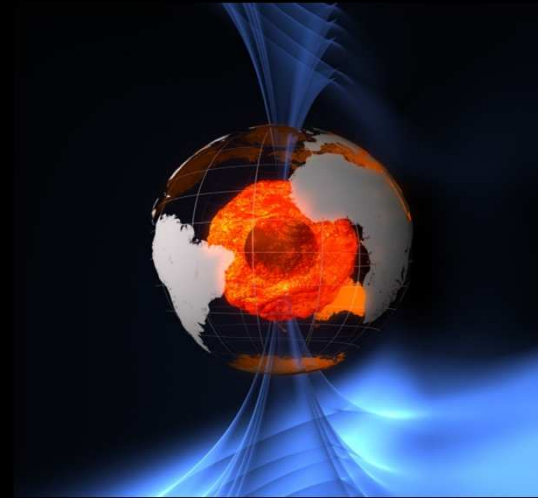
A journey to the centre of the Earth (Jules Verne)



Earth's Magnetic fields: invisible but apparent



- produced to a large extent by a **self-sustaining dynamo**, operating in the fluid **outer-core**,
- also caused by **magnetised rocks** in the Earth's **crust**,
- electric currents flowing in the **ionosphere**, **magnetosphere** and **oceans**
- and by currents **induced in the Earth mantle** by time-varying **external fields**.



GOCE: Scientific Context of Mission

Solid Earth Physics
focus on anomalous density structure of lithosphere and upper mantle, and better constraints for modelling of Earth's interior

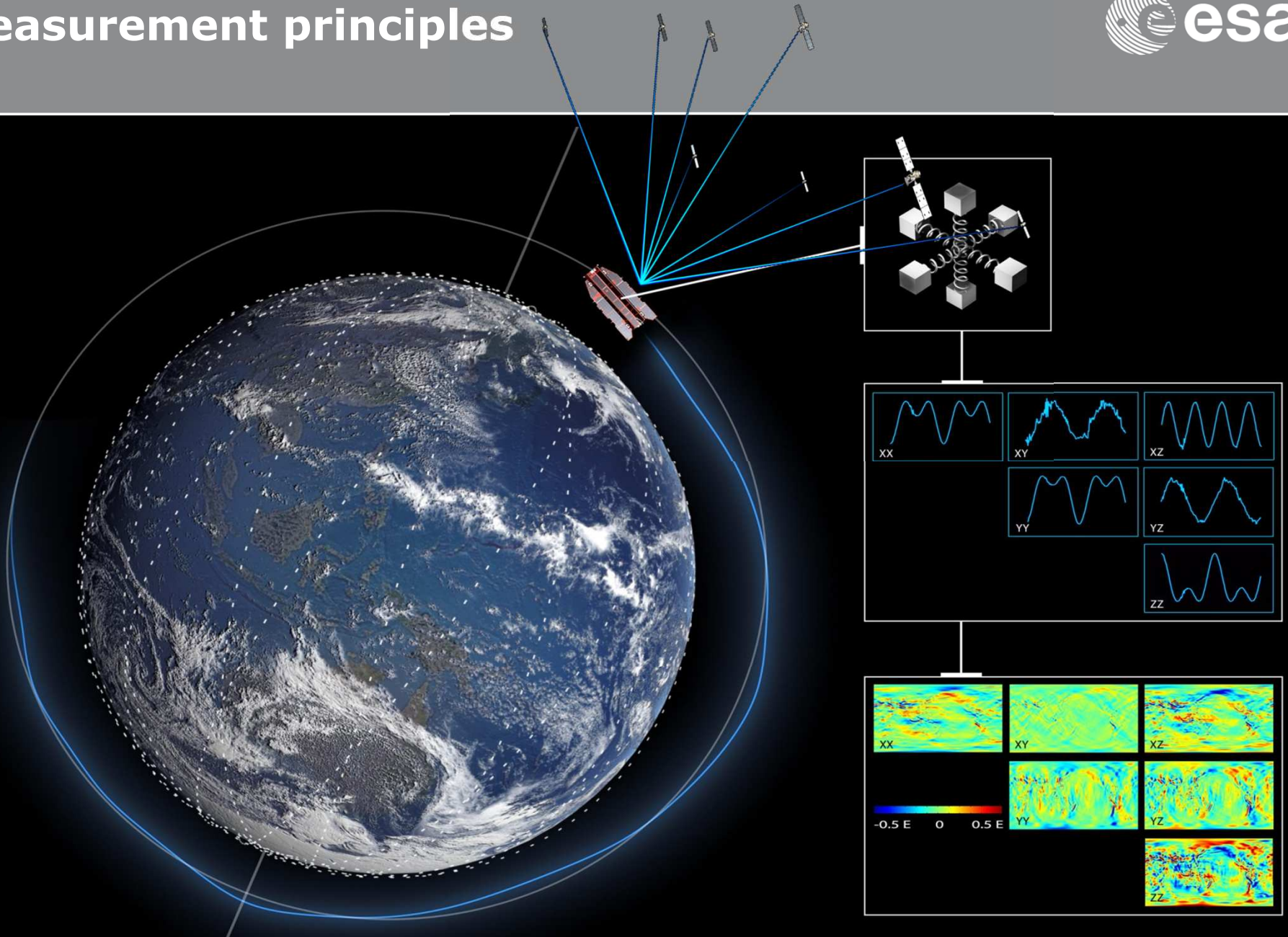
Oceanography
determination of dynamic ocean topography, absolute ocean circulation, and mass and heat transfer

Ice Sheets
improved knowledge of ice sheet mass balance

Geodesy
unified height systems, "levelling by GPS" (i.e. orthometric heights)

*and from the above, improved rate estimates of **Sea Level Change***

Measurement principles

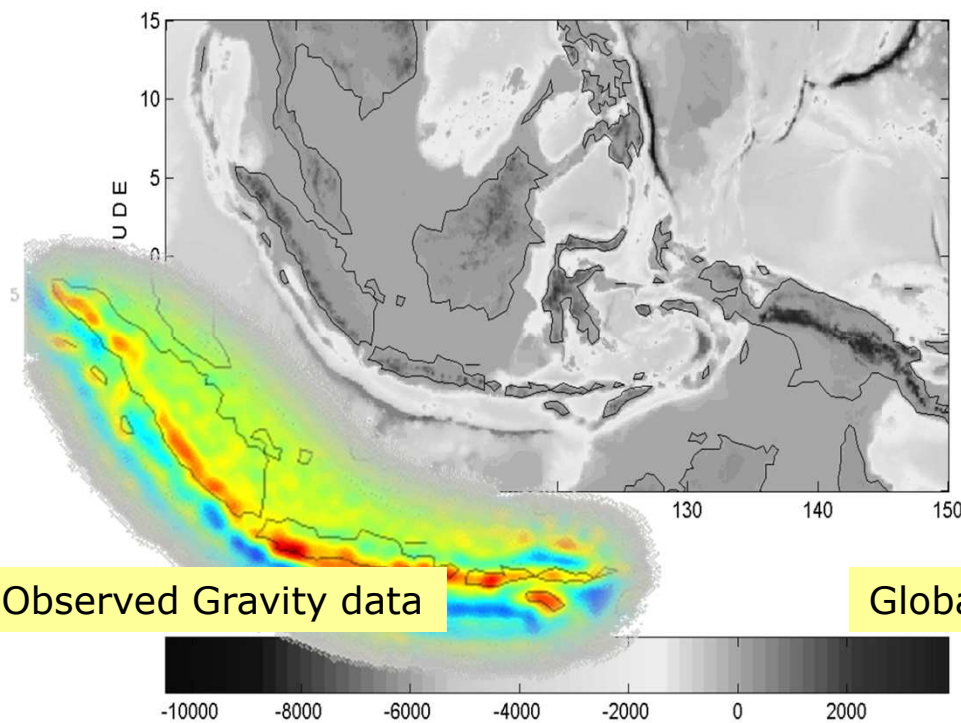


Global solutions for global SE analysis ?



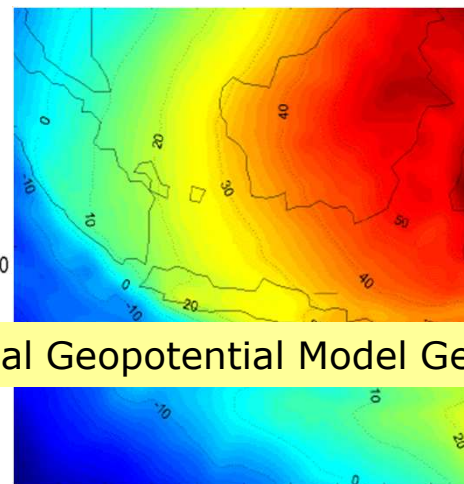
Availability of global geopotential model and gravity

Topography [m]: Indonesian Archipelago



For example for:

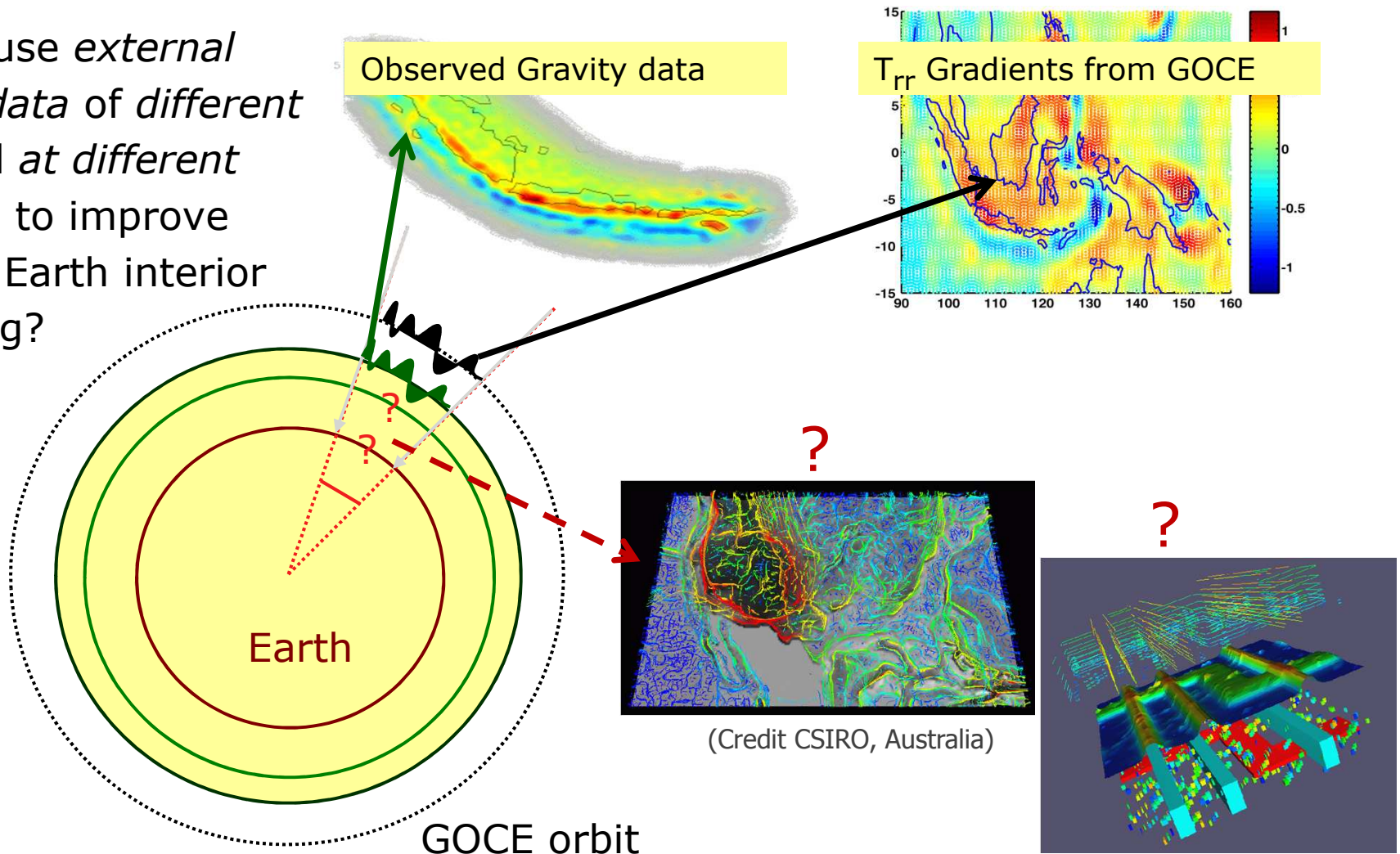
- ✓ global isostasy modelling
- ✓ mantle studies
- ✓ PGR and sea level



Use of satellite gradients for modelling?



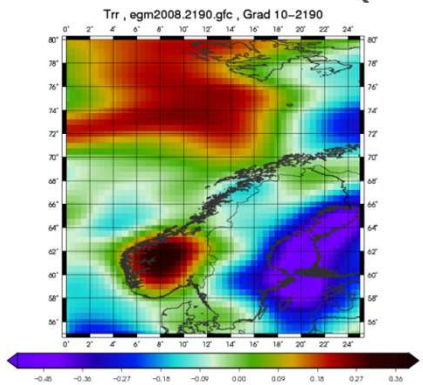
Can we use *external gravity data of different type and at different altitudes* to improve regional Earth interior modelling?



Theme 2: Heterogeneous gravity data combination for Earth interior and geophysical exploration research

2 parallel contracts:

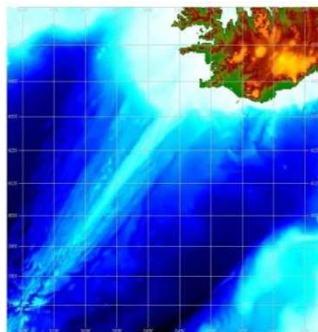
- Team 1: DGFI (DE), NGU (NO), TNO (NL)



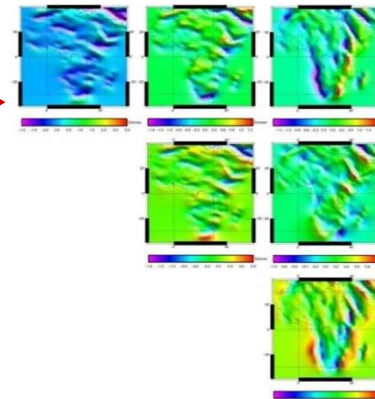
← **NE Atlantic margin**
Saudi Arabia →



- Team 2: UWB (CZ), AAS (AT), AUT (GR), DIAS (IR), GIS (DE), TUD (NL)

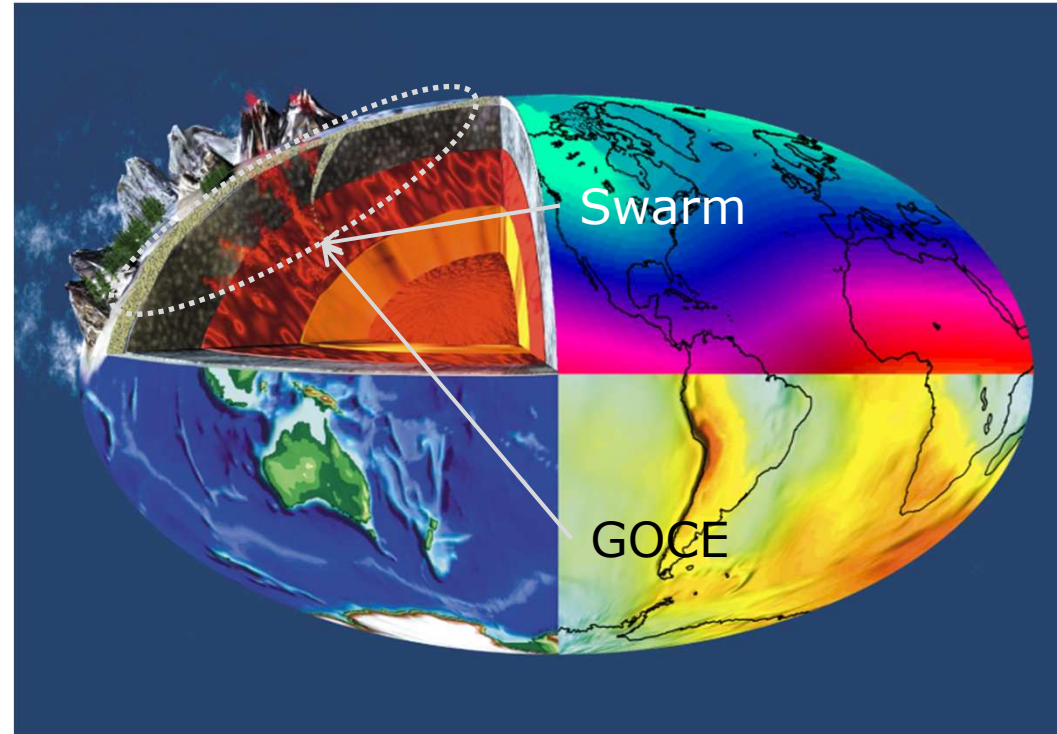


← **Mid-Atlantic ridge**
Africa →



Earth's interior

Improved modelling of Earth crust and mantle from gravity (**GOCE**), magnetic (**Swarm**) and seismic information



What is fiction, what reality: let's find out !!

