Understanding the forces that shape the Earth

September 11 2013

Credit: AI-generated image (disclaimer)

Subduction is the process occurring where the Earth's tectonic plates meet - and one plate slides beneath the other, taking surface material to its interior. This process leads to a large variety of phenomena at the Earth's surface, ranging from volcanism to the deepest and most destructive earthquakes.

However, many aspects of subduction are still poorly understood. Research is critical to understanding where such forces could lead to human disasters. It could also help answer basic questions on the chemical and thermal history of our planet.

Running from 2007 to 2011, the EU-funded project C2C ('Crust to core: the fate of subducted material') was aimed at creating a working European research network that would advance the basic understanding of the subduction process.

Led by the University of Bayreuth, the researchers identified key questions for further research and improved coordination and cooperation among leading research groups in the study of subduction.

The project brought together eleven partner institutions all over Europe with expertise in petrology, experimental and computational mineralogy, analysis, synthesis, and dynamic studies of the Earth's interior.

The team's research focused on source mechanisms for earthquakes, the transport of fluids through the mantle, and the extraction of magma from the Earth's interior.

Understanding the controlling mechanisms of these phenomena requires a good characterisation of the physical properties of minerals involved and the environment of the Earth's mantle with which they interact.

The C2C team addressed a number of specific questions, including the:

- role of arc volcanism volatiles, such as water and CO2;
- melting behaviour of carbon-bearing rocks, mostly sediments;
- stability of carbonates (MgCO3-FeCO3-CaCO3) at high pressure;
- composition of fluids released in subduction zones.

One outcome with a huge potential for advancing knowledge on how life started on Earth resulted from an investigation of the dissolution of Fe-carbonate $FeCO_3$ (siderite) in an aqueous solution.

Researchers discovered a redox reaction with the simultaneous formation of organic molecules. Such a reaction could have played an important role in the origin of life on Earth.

Aside from its scientific achievements, the C2C network also contributed significantly to training young researchers. A number of the key participants were Marie Curie Fellows, carrying out doctoral or initial post-doctoral work.

The C2C project received around EUR 2.6 million in EU funding.

More information: cordis.europa.eu/projects/rcn/82454_en.html

Provided by CORDIS

Citation: Understanding the forces that shape the Earth (2013, September 11) retrieved 22 July 2024 from https://phys.org/news/2013-09-earth.html