

Slippery stretching explains ocean floor formation

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For the first time, scientists have found regions of the earth's crust which are stretching apart to form new sea floor; their findings are published in Nature yesterday (27 July).

Most new ocean floor is made when undersea volcanic activity splits the crust and molten rock fills the gaps. However some new ocean floor develops when rock stretches along gently inclined tectonic faults called detachment faults.

The new research suggests the significance of this stretching process as a way of creating new sea floor has been underestimated. No active examples of these detachment faults had been seen - until now.

Co-author Prof Joe Cann, from the University of Leeds said:

“Detachment faults appear to break one of the most fundamental rules of geology. After all of the theorising about them, trying to explain how they might exist, it is immensely exciting to discover active faults emerging from the sea floor.”

Detachment faults are characterised by their curved surfaces, like corrugated iron roofs, and by swarms of tiny earthquakes. Because the distinctive shape of the faults as they emerge, it was possible to show that along 80 kilometres of the Mid-Atlantic Ridge all of the new crust along one side was being formed through a chain of linked detachment faults each at a different stage of evolution, which was highly unexpected. After a while, each fault becomes inactive, and is replaced

by a newly-emerging fault.

Co-author Deborah Smith, of Woods Hole Oceanographic Institution, said: “In our area, detachment faulting is the most important way in which new ocean floor is constructed. The initial signs are that detachment faulting is far commoner along many hundreds of kilometres of the Mid-Atlantic Ridge than anyone had supposed before. These observations shed a new light on the evolution of the ocean floor.”

About 3 square kilometres of new ocean floor is created around the world every year. With sea floor comprising two thirds of the Earth’s crust, this new work is invaluable in helping us understand how the Earth’s surface is formed.

Widespread active detachment faulting and core complex formation near 13 degrees N on the Mid-Atlantic Ridge by Deborah Smith of Woods Hole Oceanographic Institution, USA, Johnson Cann of the University of Leeds, UK and Javier Escartin of Marine Geosciences Group, France, was published yesterday (27 July) in Nature.

Source: University of Leeds

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