

# Press Release

23/2013

Each layer a natural disaster  
GEOMAR scientists present 3D seismic analyses of volcanic deposits offshore of  
the Caribbean island Montserrat

---

the volcanic dome caused a tsunami that was 15 m high on the east coast of Montserrat and still one meter high when it reached the neighbouring island where it destroyed several fishing boats.

With the help of 3D seismic data, the Kiel-based scientists were able to distinguish between various offshore deposits and their temporal evolution better than would have been possible with previously employed scientific methods. Their data enabled them to closely observe bounding layers between individual deposits and the seafloor. „We were surprised, for example, that pyroclastic flows that extend into the ocean have barely eroded the substrate beneath the seafloor onto which they were emplaced. This is markedly different behaviour from that which we know of pyroclastic flows on land“, explains the geophysicist Jens Karstens from GEOMAR. „In contrast to that, the much larger flank collapses can be highly-erosive, which could lead to more rapid deceleration and thereby smaller tsunamis than what has been previously assumed“, adds his colleague Dr. Gareth Crutchley.

The insight that the scientists have gained into the behaviour of volcanic deposition into the ocean does not only help to unravel the history of the Soufrière Hills volcano. „Our 3D data can also be used to calibrate geological computer models with which one can better predict the potential future hazards of island volcanoes“, explains the leader of the research group Professor Berndt. „In this respect, our seismic system has proven itself as a worthwhile tool for volcanic research“.

#### References:

Crutchley, G.J., J. Karstens, C. Berndt, P.J. Talling, S.F.L. Watt, M.E. Vardy, V. Hühnerbach, M. Urlaub, S. Sarkar, D. Klaeschen, M. Paulatto, A. Le Friant, E. Lebas, F. Maeno (2013): Insights into the emplacement dynamics of volcanic landslides from high-resolution 3D seismic data acquired offshore Montserrat, Lesser Antilles. *Marine Geology*, Vol. 335, <http://dx.doi.org/10.1016/j.margeo.2012.10.004>

Karstens, J., G.J. Crutchley, C. Berndt, P.J. Talling, S.F.L. Watt, V. Hühnerbach, A. Le Friant, E. Lebas, J. Trofimovs (2013): Emplacement of pyroclastic deposits offshore Montserrat: Insights from 3D seismic data. *Journal of Volcanology and Geothermal Research*, Vol. 257, <http://dx.doi.org/10.1016/j.jvolgeores.2013.03.004>

#### Links:

[www.geomar.de](http://www.geomar.de) GEOMAR Helmholtz Centre for Ocean Research Kiel

#### Images:

At [www.geomar.de/n1271-e](http://www.geomar.de/n1271-e) images are available for download.

#### Contacts:

Prof. Dr. Christian Berndt (GEOMAR, FB4-Geodynamics), [cberndt@geomar.de](mailto:cberndt@geomar.de)

Jan Steffen (GEOMAR, Communications & Media), Tel.: 0431 600-2811, [jsteffen@geomar.de](mailto:jsteffen@geomar.de)