



Polygenetic (tsunami and storm) deposits? A case study from Ushant Island, western France

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with 8 figures and 1 table

Abstract. Ushant Island is the westernmost island offshore western France. It is exposed to severe storms. The western peninsulas of the island are partly covered with boulders fields, the origin of which is an open question. On March 10, 2008 a very severe storm (973 hPa) was able to move some of these blocks and to raft them over several tens of meters. The heaviest block weighs about 62 tons. Some blocks were located in the intertidal zone, others were above the spring tide limit and were detached from the cliff during the storm. Most of the blocks had already existed before; thus, the event which actually caused their detachment was not the March 2008 storm. When applied to this case, the hydro-dynamical equations by NOTT would suggest a storm with wave heights of 12 to 50 meters. New equations by the authors reduce these values to about 8 to 32 meters. Anyhow, these heights have never been recorded in Ushant. These results thus lead to the hypothesis that the blocks were not created by a storm but by a tsunami, possibly the one of 1755 (Lisbon Tsunami). The important point is that these blocks have a polygenetic origin: they were detached from their initial location by an event which cannot have been a storm, but subsequently they were moved by each severe storm. Boulder fields on Ushant Island, therefore, seem to be polygenetic coastal high energy event features.

Keywords: Ushant, Brittany, Storm, Tsunami, Blocks

Résumé. *Dépôts polygéniques (tempête et tsunamis)? Un exemple sur l'île d'Ouessant, France.* Ouessant est la plus occidentale des îles en France métropolitaine et est exposée à de violentes tempêtes. Ses deux extrémités ouest sont en partie couvertes par des champs discontinus de blocs dont l'origine est discutée. Le 10 Mars 2008 une très violente tempête (973 hpa) a déplacé certains de ces blocs sur plusieurs dizaines de mètres. Le plus lourd pèse environ 62 tonnes. Certains étaient situés dans la zone intertidale, d'autres ont été détachés de la falaise à cette occasion. La plus part d'entre eux, cependant, préexistaient à la tempête qui n'est pas responsable de leur origine. Les équations hydro-dynamiques de NOTT suggèrent des vagues de tempêtes de 12 à 50 m. D'autres équations, par les auteurs de cet article réduisent ces valeurs à 8 à 32 m mais de telles hauteurs maximales sont plus qu'improbables à Ouessant. De tels résultats conduisent à formuler l'hypothèse selon laquelle les blocs ont été créés par un tsunami (celui de 1755 ?) et que les fortes tempêtes suivantes se sont contenté de les transporter. Les champs de blocs sont des accumulations polygéniques dues à des événements de haute énergie variés.

Mots etès: Quessant, Bretagne, Tempête, Tsunami, Blocs

1 Introduction

One of the key problems in coastal hazard assessment is the need to differentiate between the effects of storm and tsunami impacts. After the pioneer works of ATWATER (1987), DAWSON (1994), EINSELE et al. (1996) and BRUZZI & PRONE (2000) other studies have tried to set a list of differences between sandy deposits related to historical storms and others