Tsunami or storm deposits? The 1929 'Grand Banks' tsunami versus the 1991 Halloween storm

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Tsunami deposits related to the November 18, 1929 'Grand Banks' earthquake and washover deposits related to the October 30-31, 1991 Halloween storm differ in their sedimentary characteristics and positions on the landscape. Sedimentary deposits from the 1929 tsunami are examined in Taylor's Bay on the Burin Peninsula of Newfoundland, and those from the 1991 Halloween storm ("The Perfect Storm") are examined on Martha's Vineyard off Cape Cod, Massachusetts. With respect to sedimentary characteristics, the 1929 tsunami deposits are composed of 1 to 3 subunits of massive to fining-upward, very coarse- to fine-grained sand, whereas the 1991 storm washover deposits consist of interbedded and laminated coarse-, medium-, and fine-grained sand, exhibiting delta foreset stratification and subhorizontal, planar stratification with channels. Regarding landscape position, the tsunami deposits occur up to 340 m inland, including landward of tidal ponds, and up to 6 m above mean sea level, as well as 3 m above the tops of the barrier-beach bars and related dunes, whereas the storm washover deposits occur up to 94 m inland, immediately landward of barrier-beach bars and in adjacent tidal ponds, and up to 1.2 m above mean sea level but no higher than the elevation of the barrier-beach bars. These observations compared with those from other studies form the basis of proposed criteria for distinguishing palaeo tsunami from palaeo-storm deposits in the geologic record. If palaeo-tsunami, or historic tsunami, deposits can be identified with confidence, they will contribute to the assessment of tsunami and seismic hazards along the coast of eastern North America and elsewhere in the North Atlantic Ocean.

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