



## Impacts of storms on Recent planktic foraminiferal test production and CaCO<sub>3</sub> flux in the North Atlantic at 47 °N, 20 °W (JGOFS)

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Planktic foraminiferal assemblages are well known to vary in accordance with seasonal fluctuations in ocean properties, periodic reproduction cycles, and variations between water masses. Here we report that storms also can significantly influence foraminiferal assemblages. During the RV Meteor cruise 21 to the Northeast Atlantic Ocean (biotrans area), from March to May 1992, planktic foraminifera were sampled using a multiple opening-closing net. While sampling, two storms with wind forces up to 12 Beaufort caused intensified surface layer mixing with shifts in the depth of the upper ocean mixed-layer from 20-40 m to 170-240 m. Subsequently, planktic foraminiferal growth rates increased, resulting in an elevated quantity of small (100-150 µm) tests (Phase 1). When the wind strength increased a second time, the mixed-layer deepened to a depth below the former position of the pycnocline, and again the abundance of small tests increased (Phase 2). During Phase 2, the weight of calcite in specimens of the productive zone reached its maximum. In the export zone, an associated increase in empty tests occurred with a lag time depending on the test sinking velocity. In the upper export zone, down to 700 m water depth, CaCO<sub>3</sub> flux increased from 9.3 to 49.8 mg CaCO<sub>3</sub> m<sup>-2</sup> d<sup>-1</sup> after the first storm and from 8.9 to 19.9 mg CaCO<sub>3</sub> m<sup>-2</sup> d<sup>-1</sup> after the second storm. In the 700 to 2500 m depth interval, the flux increased from 5.1 mg CaCO<sub>3</sub> m<sup>-2</sup> d<sup>-1</sup> to about 9.2 mg CaCO<sub>3</sub> m<sup>-2</sup> d<sup>-1</sup>. Thus, the standing stock of living foraminifera and export of empty tests from the productive zone increased after the storms, leading to pulses of CaCO<sub>3</sub> exported from the surface to deep water.

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