

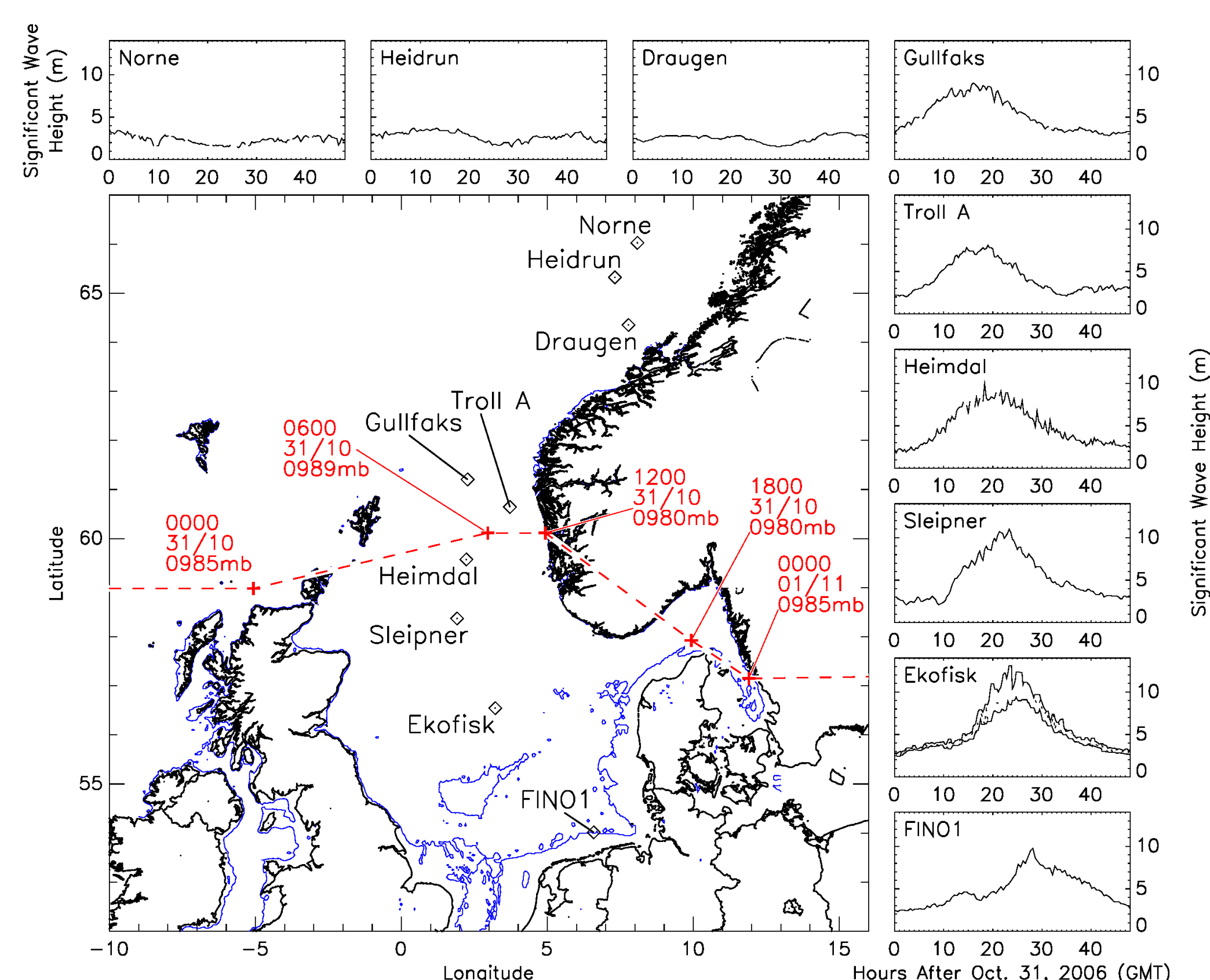
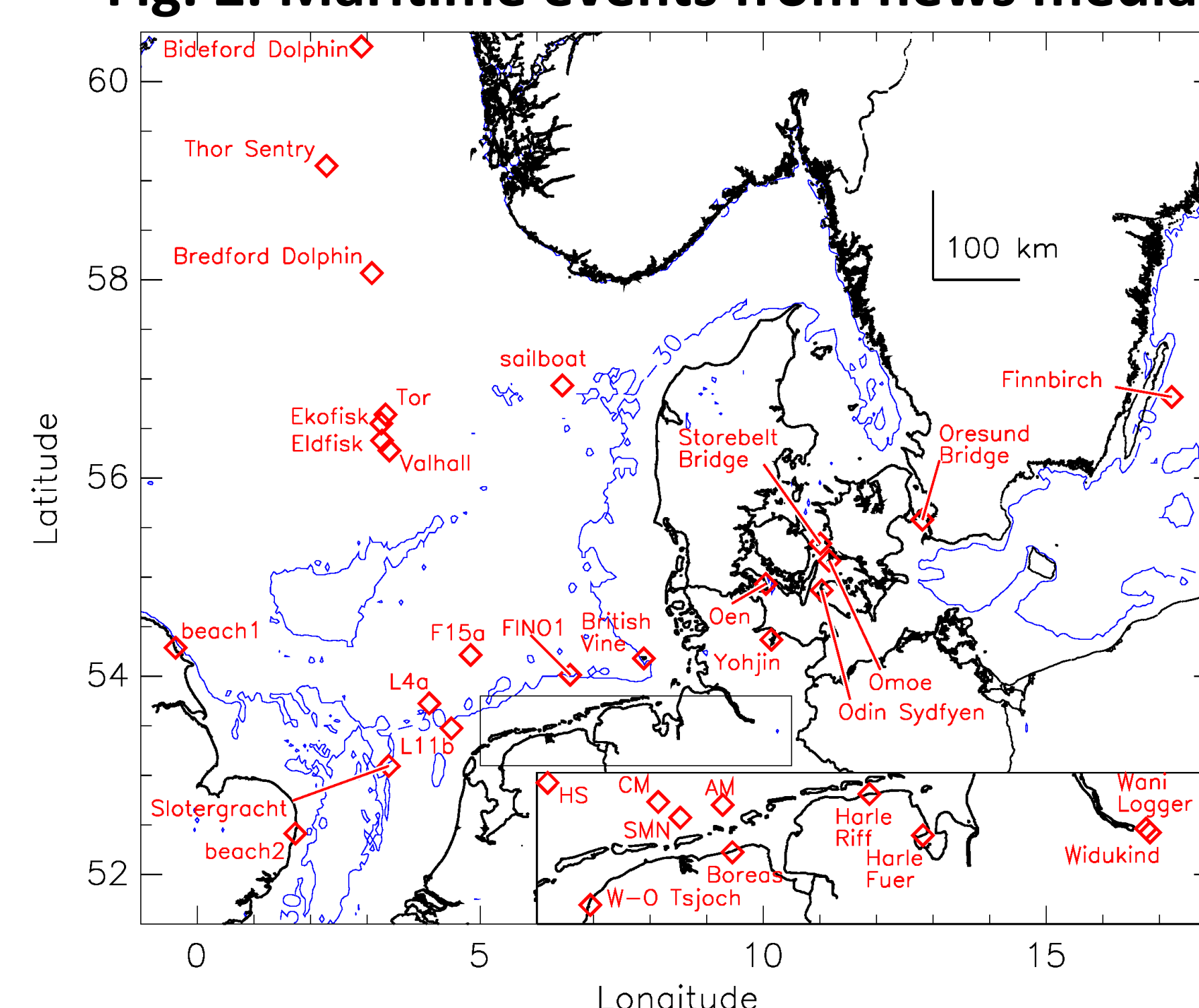
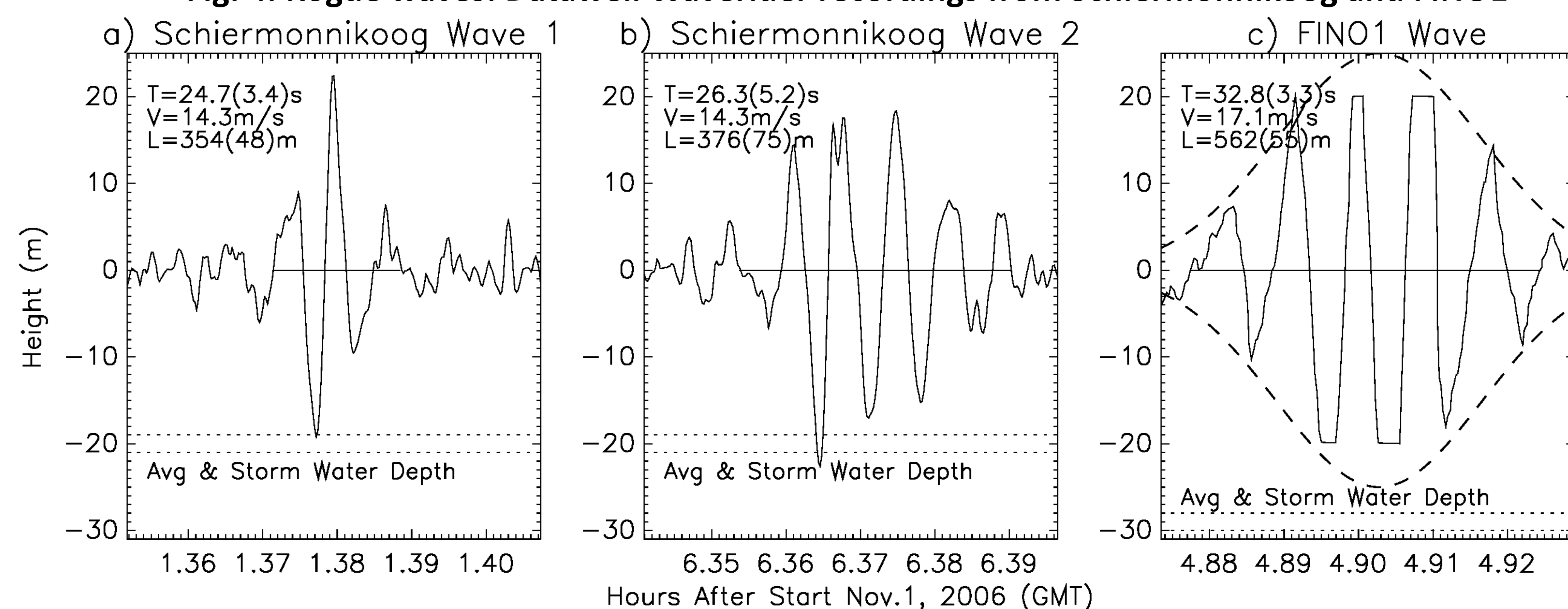
## Damage to the FINO1 Platform, Nov. 1, 2006

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The Britta storm of Oct.31-Nov.1, 2006 was a severe early winter event that was particularly damaging for shipping in the North Sea and coastal flooding from storm surge effects. The low pressure center of the storm passed north of Scotland and across western Norway and northern Denmark and resulted in the strong winds blowing southward along the axis of the North Sea and a cold air outbreak into the center of Europe. The long fetch associated with the cyclonic circulation behind the low pressure center resulted in the formation of a high ocean wave field that propagated southwards across North Sea over an 18 hour period (Fig. 1). A progression of ship and platform difficulties were registered across the North Sea culminating near the coast of Germany and the Netherlands with a series of ship emergencies that were linked with high waves in shallow water, known locally as a 'ground sea' (Fig. 2). The worst ship damage was characterized by unusually high waves that broke the windows of the navigation bridge, necessitating emergency rescues. In the central and southern North Sea, petroleum production and research platforms experienced wave damage. The offshore wind energy platform FINO1 had wave-related cable breaks and structural damage at a 15m working deck (Fig. 3). Most meteorological and oceanographic instruments remained functional to give a unique profile of the storm. The Waverider buoy at the FINO1 site appeared to register a rogue wave group with sea level displacements exceeding 20m above the ambient sea level, which was characterized by a combined high tide and storm surge at the time (Fig. 4). Other rogue wave events were registered nearby in the Dutch coastal sector at another Waverider buoy at Schiermonnikoog. Little is known about rogue wave behavior, but the arrangement of wave events in space and time during the Britta storm indicates that at least a small number of rogue wave groups were needed to account for the incidents across the northern and southern North Sea. The literature suggests that severe storms like Britta have increased in frequency over the North Sea and Baltic Sea during the past two decades. A description of the Britta storm is presented with a brief overview of ship/platform incidents, available satellite information (Fig. 5), and data from the FINO1 platform.

**Fig. 1. Storm track and waves at offshore sites****Fig. 3. Damage on FINO1 at 15m height****Fig. 2. Maritime events from news media****Fig. 4. Rogue waves: Dataswell Waverider recordings from Schiermonnikoog and FINO1****Fig. 5. Quikscat satellite wind speed for Oct. 31-Nov. 1, 2006: winds above hurricane-threshold**