Suspended sediment dynamics above submerged compound sand waves observed during a tidal cycle

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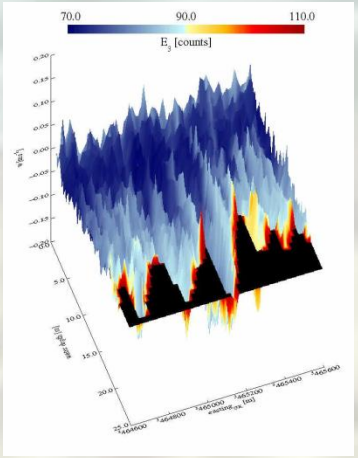
Dagmar Herbers



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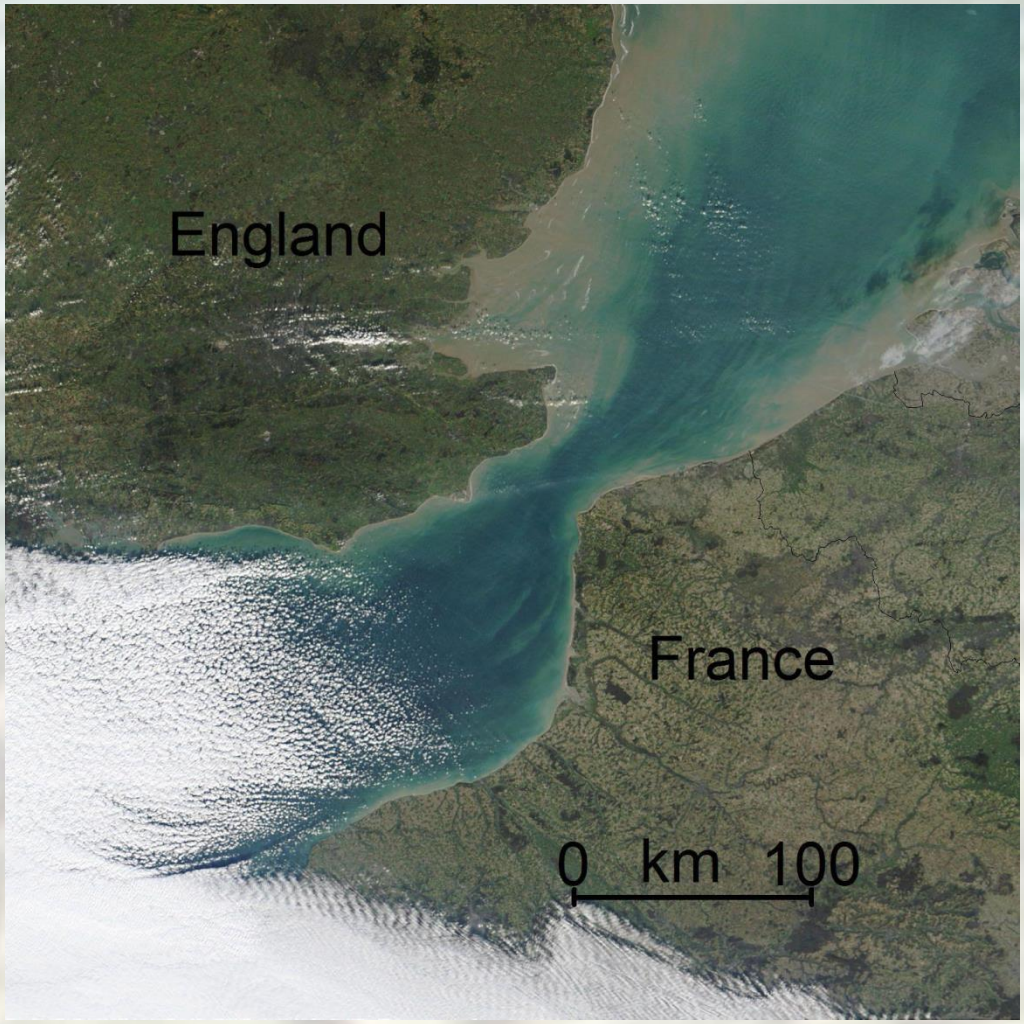
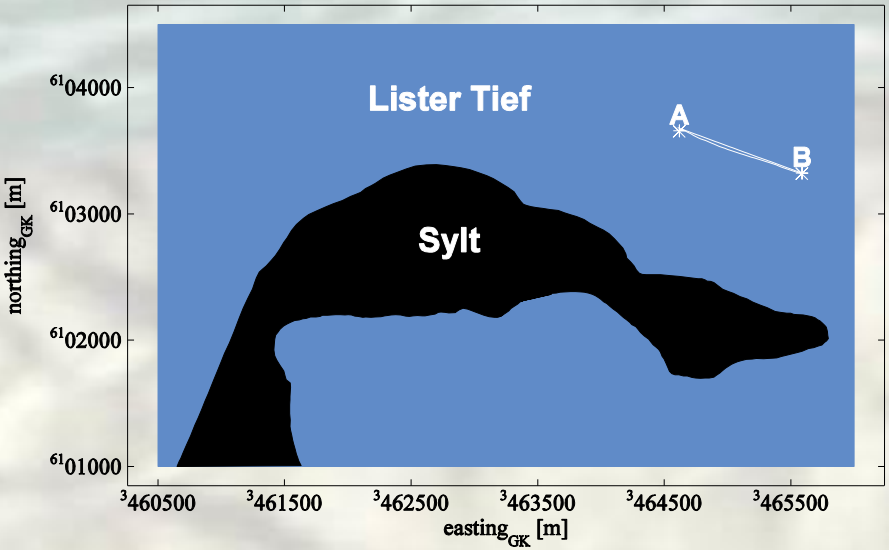
Terra-MODIS satellite image of the Strait of Dover acquired on 9 December 2002; spatial resolution: 250 m (NASA)



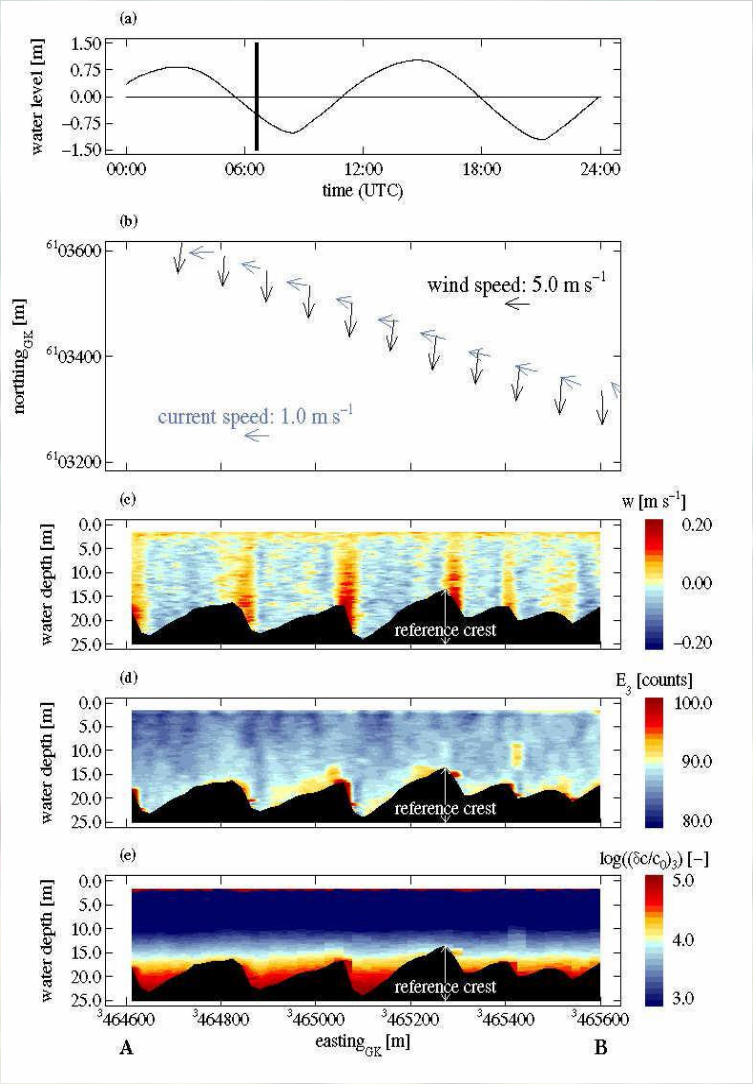
Handheld camera image of Hohwacht Bight at the German coast of the Baltic Sea acquired on 8 February 2015

Overview of the North Sea

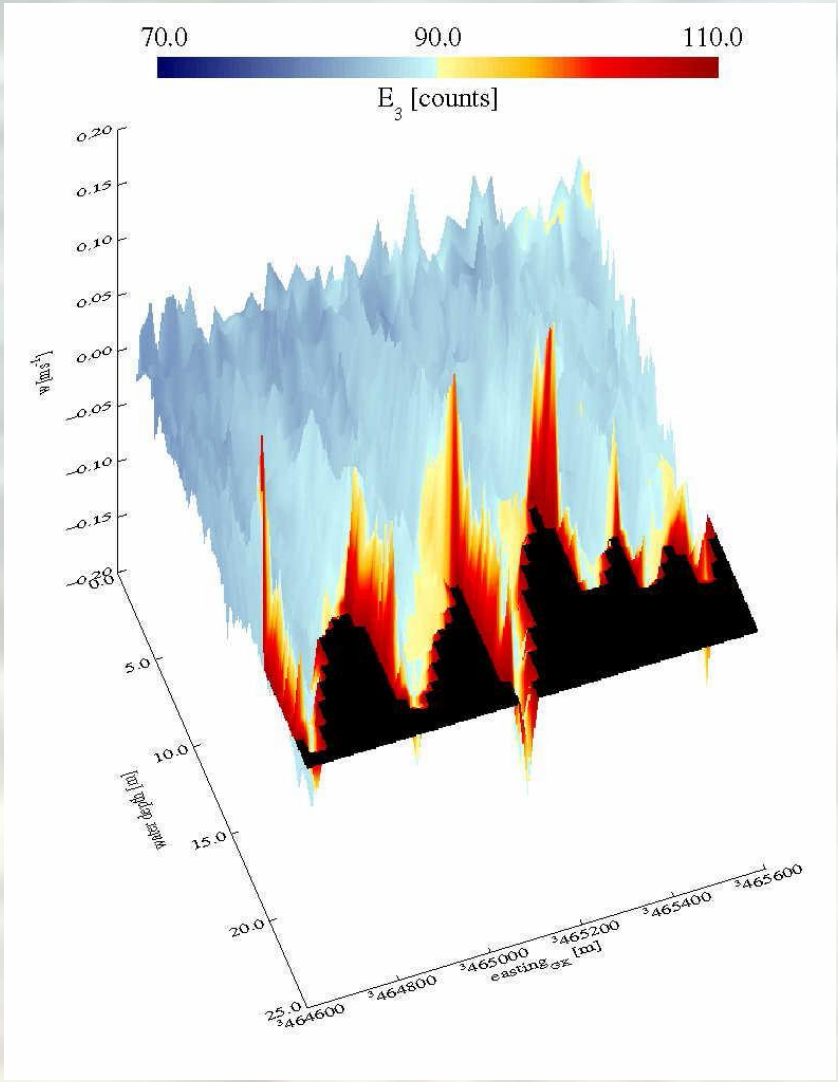
Positions of runs along transect AB in the study area of the Lister Tief in the German Bight of the North Sea



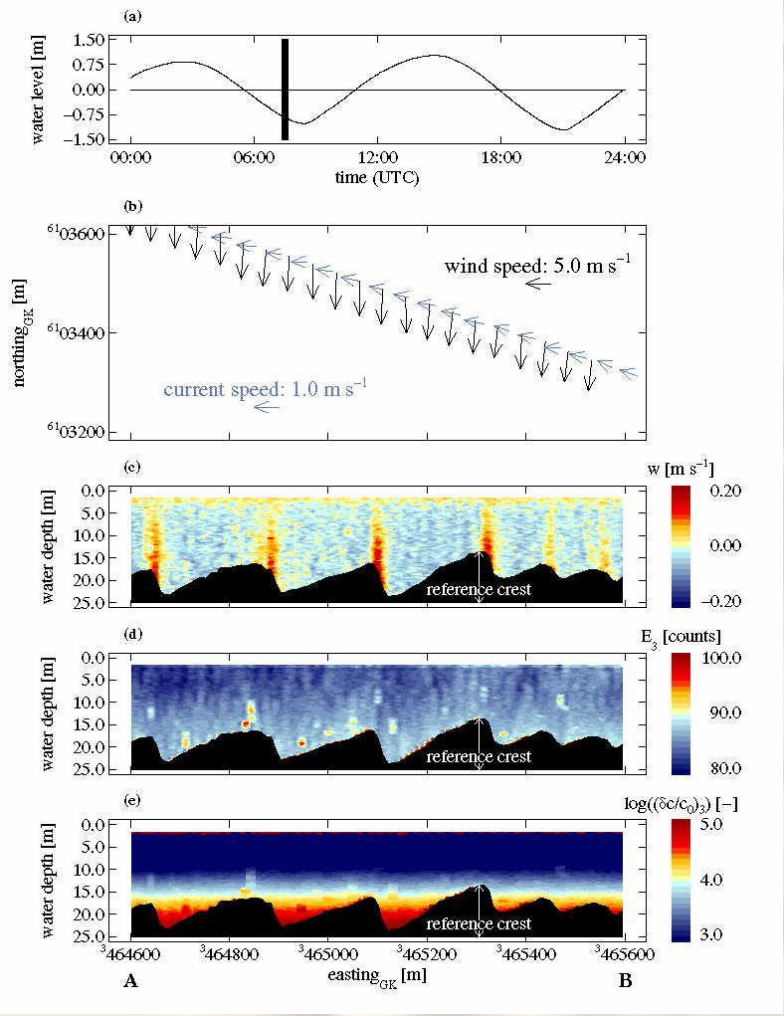
Analyzed ADCP and oceanographic data of run 48 along transect AB during ebb tidal phase at 06:33-06:41 UTC on 10 August 2002



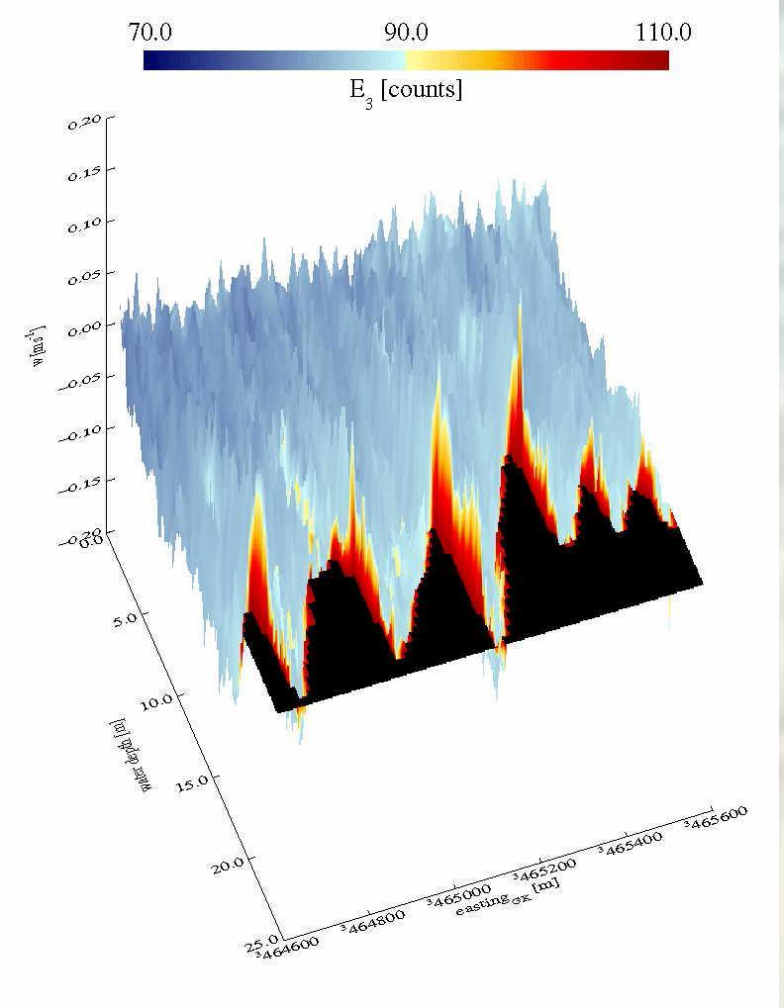
Three dimensional presentation of *w* and E_3 (color coded) as a function of water depth of run 48 along transect AB as shown on the left side



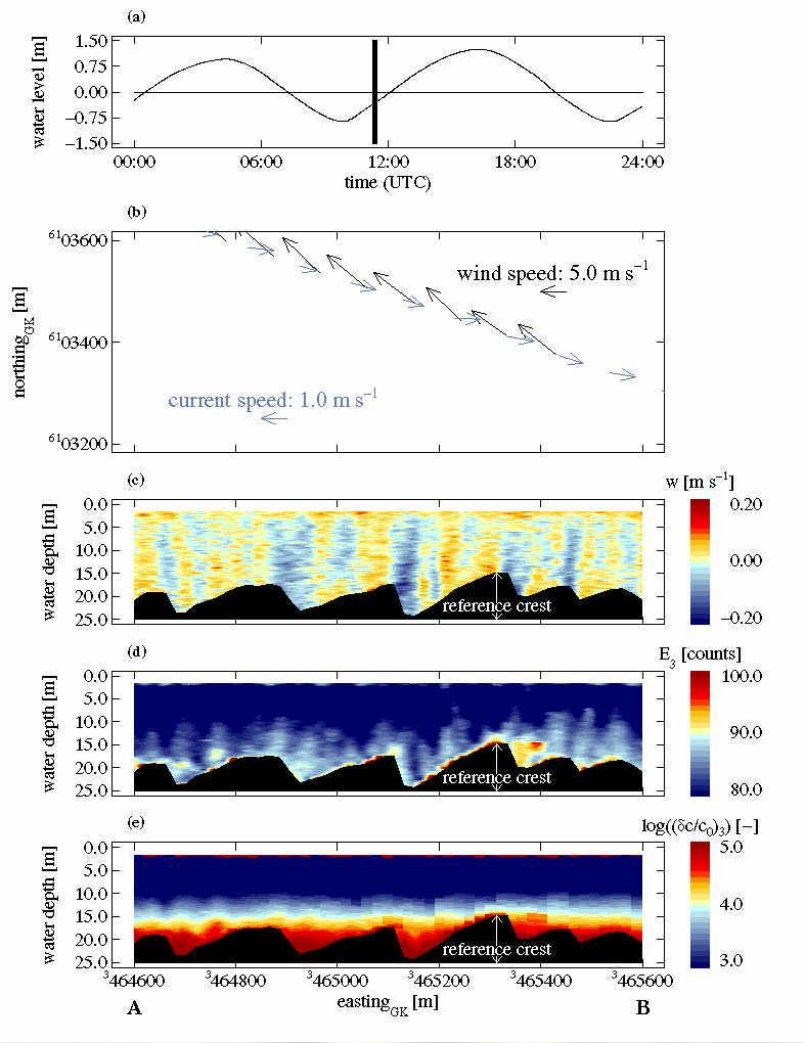
Analyzed ADCP and oceanographic data of run 51 along transect AB during ebb tidal phase at 07:21-07:40 UTC on 10 August 2002



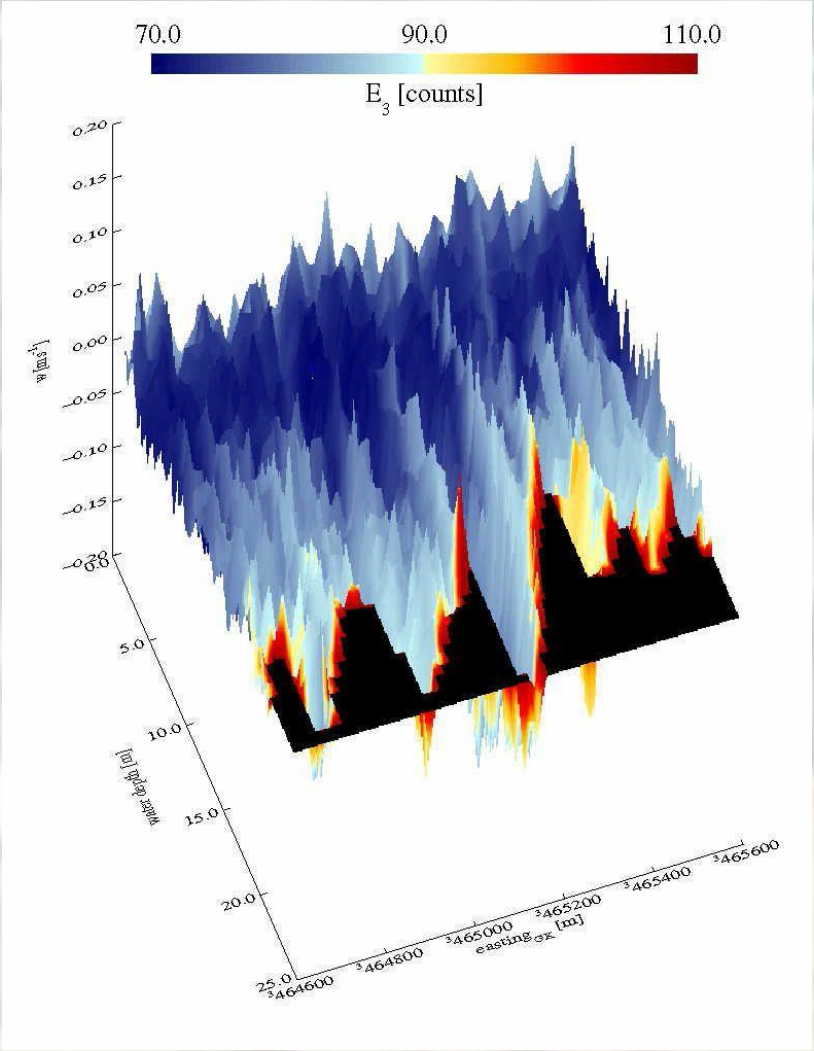
Three dimensional presentation of *w* and E_3 (color coded) as a function of water depth of run 51 along transect AB as shown on the left side



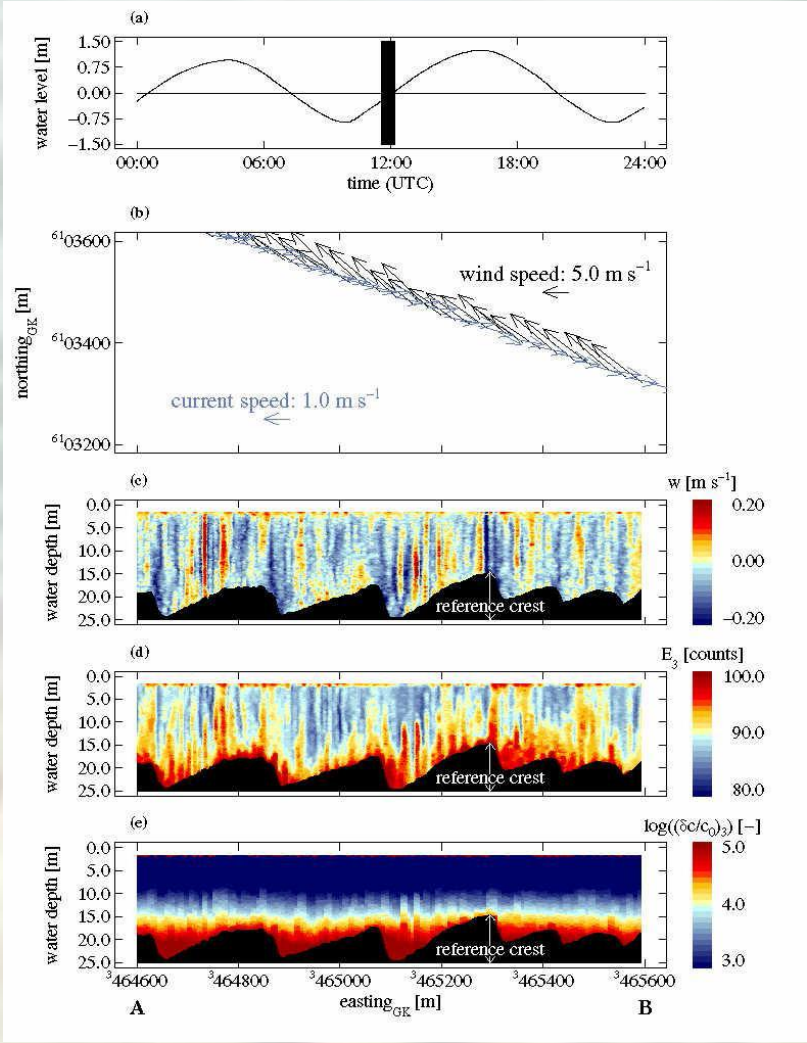
Analyzed ADCP and oceanographic data of run 64 along transect AB during flood tidal phase at 11:16-11:28 UTC on 12 August 2002



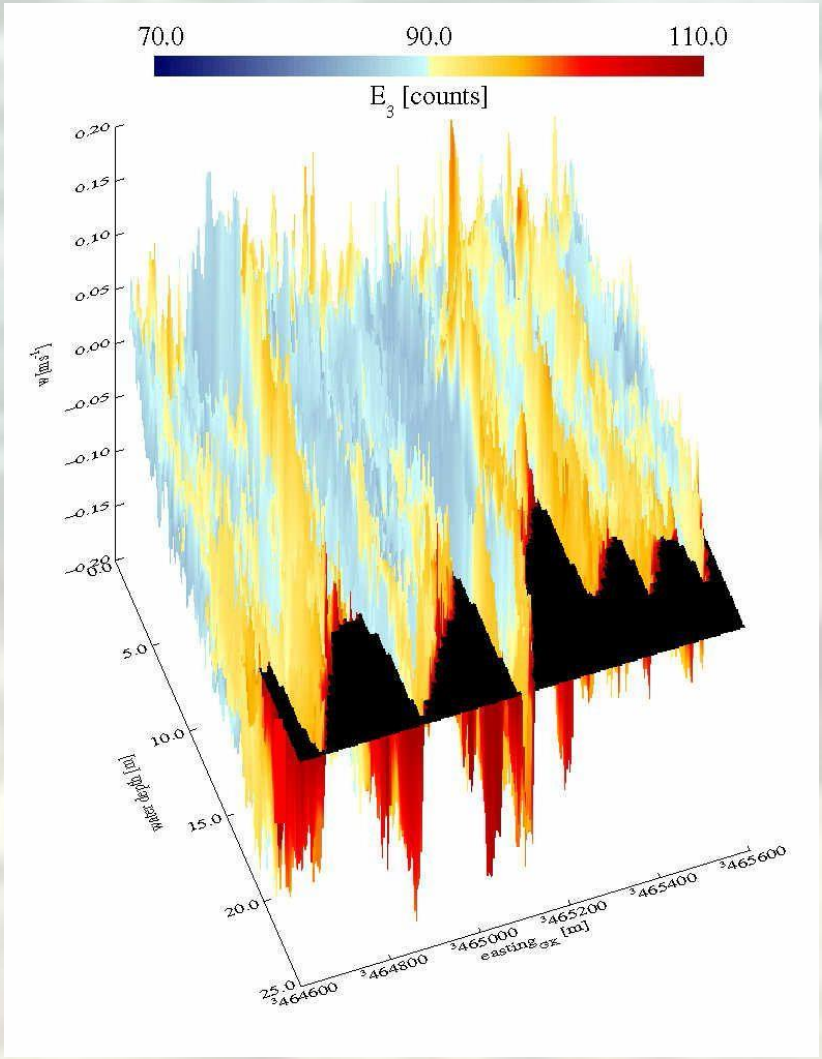
Three dimensional presentation of *w* and E_3 (color coded) as a function of water depth of run 64 along transect AB as shown on the left side



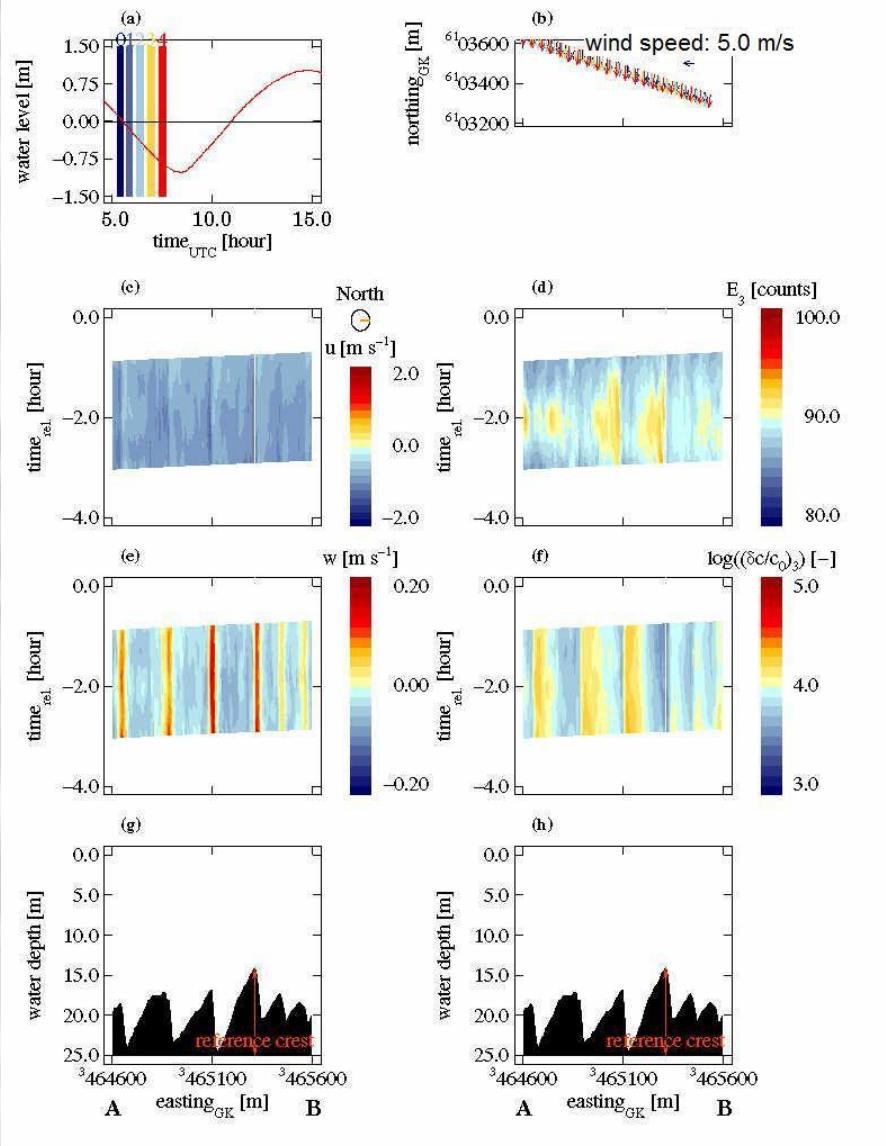
Analyzed ADCP and oceanographic data of run 65 along transect AB during flood tidal phase at 11:33-12:10 UTC on 12 August 2002

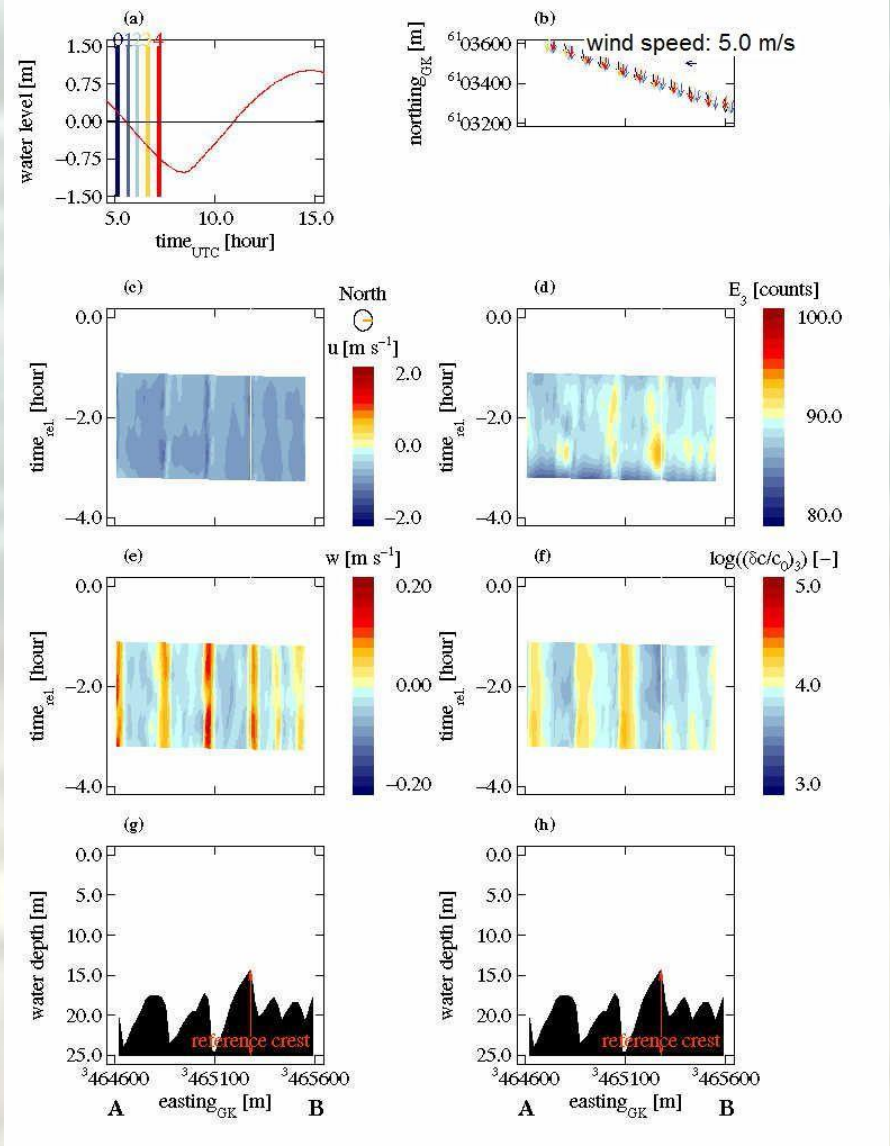


Three dimensional presentation of *w* and E_3 (color coded) as a function of water depth of run 65 along transect AB as shown on the left side



Time series of five selected runs of ADCP data during ebb tidal current phase on 10 August 2002; research vessel is sailing against the current (left figure) and with the current (right figure)





Conclusions

1.) Magnitudes of echo intensity E_3 and calculated *SSC* modulation $log\ ((\delta c/c_0)_3)$ depend on wind and current velocities.

2.) Bursts of *w* and E_3 may be triggered at disturbances like megaripples superimposed on sand waves by current wave interaction at high current and wind speeds observed of opposite directions.

3.) ADCP data of *u*, *w*, and E_3 show a definite phase relationship with the crest and upper gentle slope regions of sand waves during ebb tidal current phase.

4.) Enhanced $log\ ((\delta c/c_0)_3)$ shows a phase relationship with trough regions of sand waves during ebb tidal current phase.

5.) During well developing flood and ebb tidal currents the intensities of *u*, *w*, and $log\ ((\delta c/c_0)_3)$ are weakly time dependent.