

ACCURATELY QUANTIFIED CASES OF EXTREME WAVES IN VISUAL VOS DATA: FREAKS OR WIND WAVE EXTREMES?

(Multicase study)

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What are the [observed] extreme waves in VOS?

(i) Storm-associated waves(ii) Observational artifacts(iii) Freak events?

SUMMARY:

Visual VOS observations are likely to frequently indicate extremely high waves (both sea and swell), potentially affecting extreme statistics

Of 2621 cases of waves higher than 16 meters, only 89 are the real high wind seas and [likely] 68 are real swells

This fits to the percentiles of ~99.9 which is about 30 times smaller (1-p) compared to the initial set of cases

How many extremely high waves are reported by VOS? 2621 cases of reported waves > 16 meters height (1950-2007)



P ~ 99.9974, *rp* (20 *m*) ~ 124 years

Sea and swell reports (1950-2007)



789 cases



1832 cases

Wind sea height



Wind sea analysis



Swell analysis



2D wind sea height (swell height) – wind speed distributions



Wind sea analysis





Wind sea: associated synoptic analysis



January 2006 storm



By courtesy of Anne Karin Magnusson, Magnar Reistad, Øyvind Breivik, Rasmus Myklebust and Ellis Ash



WRF HR modelling for 84 events

> 11 Nov 1991 12 km x 12 km **37 levels**



89 events 3% of all, 11% of seas)

After all case study analyses:





24

22

20

18

16

Mean wind sea height = 17.1 m Mean associated wind = 22.4 m/sMean steepness = 12 Mean period = 9.4 sec

P~99.91

Dogger bank



6 cases of wind sea

9 cases of swell

Swell – likely real cases







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