

## Metocean conditions for Elf-Petroland sites in the southern North Sea

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### assignment

Elf-Petroland commissioned WL | Delft Hydraulics to determine a wide range of updated metocean conditions for 7 locations in the southern North Sea. These locations are the sites of nearly 30 existing and planned platforms. The study comprised both the determination of extreme (with return periods of 1, 10 and 100 years) and normal (annual and seasonal) conditions as well as specific physical and chemical parameters. After determination of the extreme design conditions for the platform sites, all conditions were evaluated for mutual consistency. The conditions were presented in standard required tabular and graphical formats.

These studies were supplemented with a brief desk study to estimate the conditions during a recent severe storm. Measured data was interpreted in order to estimate the conditions at the platform site and subsequently a number of related parameters such as the highest expected wave height and crest level were assessed.

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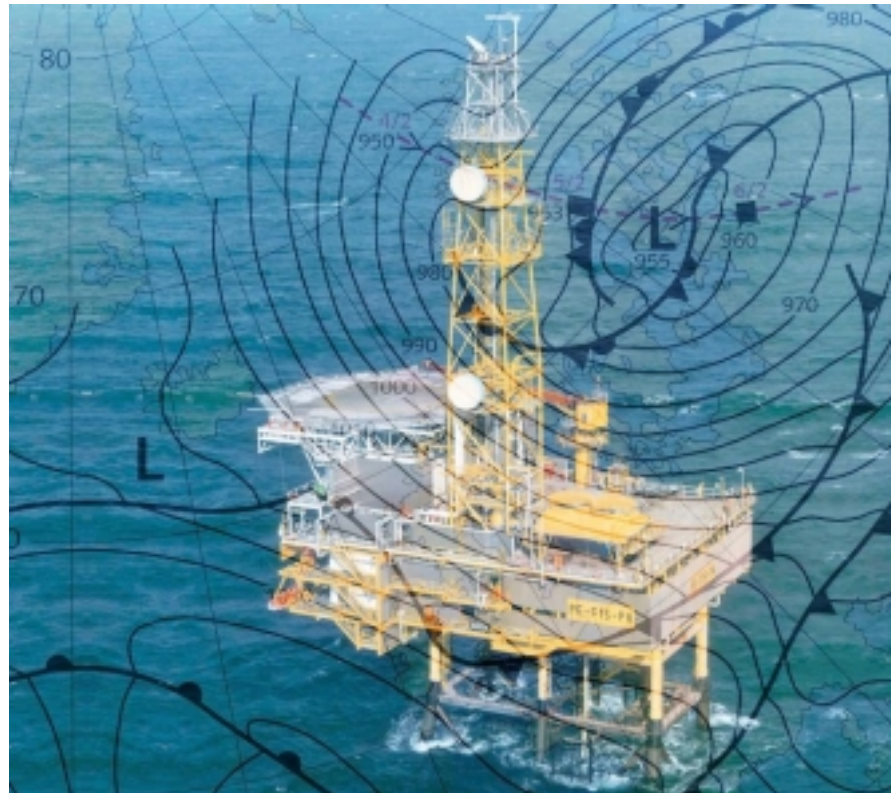
### client

Elf-Petroland, The Hague, The Netherlands

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### period

October 1999 - February 2000



keywords:  
metocean  
offshore  
North Sea



## metocean conditions

For the design and operation of offshore installations, a range of hydraulic and meteorological parameters are required. These metocean conditions have been examined for a total of seven Elf-Petroland fields in the southern North Sea.

Extreme conditions with return periods of 1, 10 and 100 years (per directional sector and omnidirectional) have been determined, comprising sea state, maximum wave height and associated period, tide and surge levels, maximum crest level, windspeeds and the total current velocity at various depths.

The provided normal conditions included the annual and seasonal probability of exceedance of the significant wave height in each wave direction, the joint probability of significant wave height and mean wave period and the number of individual waves in each height/period and height/direction class. The joint probability of wind speed and wind direction and total depth-averaged current speed and direction have also been examined.

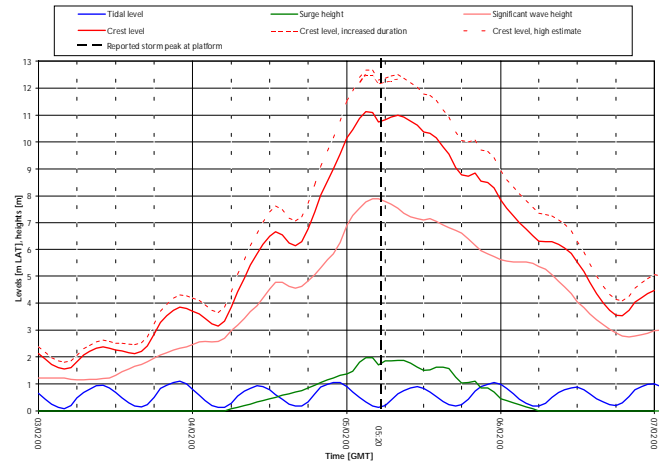


Physical and chemical data were retrieved from literature.

By comparing metocean conditions for all seven locations of the Elf-Petroland fields, the mutual consistency was checked, taking into account the geographic position. In this way the reliability of the datasets has been increased.

## conditions during the storm of 5 February 1999

During the storm of 5 February 1999 the staff of one of the platforms reported severe conditions. To obtain insight in the severity, the estimates for some of the parameters at the peak of the storm were compared with the design values.



Estimated crest-level at a platform during a severe storm

Data from operational prediction models of the meteorological service of the Netherlands (KNMI) and the National Institute for Coastal and Marine Management (RIKZ) were analysed to obtain a description of the conditions during the February 1999 storm.

These data were interpreted to estimate the conditions at the location of the platform and from these a number of related parameters such as the highest expected wave height and crest level were assessed. The statistical uncertainty in the various parameters was also included in the evaluation.

### WL | Delft Hydraulics

Decisive advice: from multidisciplinary policy studies to design and technical assistance on all water-related issues.

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