



Swindon, UK, 5 April 2004

MAJOR STUDY CLEARS UP SQUALLS FOR ENGINEERING

Squalls off West Africa are the subject of a major new study awarded to Fugro GEOS as part of a Joint Industry Project to understand further their impact on offshore engineering.

Squalls or thunderstorms are one exception to the relatively mild metocean environment offshore West Africa. So much so that they can dominate aspects of the design and operation of offshore facilities. Although many wind data have been collected offshore West Africa in the last five years, the characteristics of squalls are not well known or understood. Key considerations for engineering applications include the vertical wind speed profile at the gust front and within the squall, the horizontal length scales of squalls and their duration, the extreme wind speeds and their associated directions, and the effects of atmospheric stability.

The West Africa Gust (WAG) Joint Industry Project has been set up to answer these questions and determine the squall characteristics offshore West Africa, with a main area of interest that extends from Mauritania to Angola. Original participants in the project are ChevronTexaco, Statoil, Total, BP, ConocoPhillips, Shell, Woodside and ExxonMobil. Working closely with a Technical Advisory Committee composed of these participants, Fugro GEOS will serve as administrator for the project as well as conduct most of the analyses. In turn, Fugro GEOS has linked up with experts from the UK's Institute for Atmospheric Science, University of Leeds, and the Department of Mathematics, University of Bristol to help with the analysis and interpretation of the data.

The analysis will start by identifying squall events in the available time-series data, which include measurements already collected by the project's participants. Then, after standardisation to allow comparisons between data from different sources, the engineering responses and squall characteristics will be investigated and quantified. This will involve calculating stability indices to

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improve the understanding of atmospheric conditions that give rise to squall events, and deriving wind speed and gust factor statistics. The impact of squalls on offshore installations will be assessed using a simplified response model, while Wavelet Analysis will be used to investigate the time dependence of squall winds and the resulting structural response.

Recommendations for quantifying squalls will be made based on the desk study. These will focus on the engineering impact of the squalls and potentially improved methods for operational forecasting, particularly for construction activity and offloading operations.

Fugro GEOS has carried out a range of metocean services, including weather forecasts, data collection and analysis offshore West Africa. It provides meteorological and oceanographic consultancy services world-wide that range from developing design criteria for oil and gas projects to providing offshore forecasters for construction support.

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Fugro collects processes and interprets data related to the earth's surface and soil composition and provides advice based on the results. As an extension to these activities Fugro provides services such as precise positioning, construction materials testing, reservoir engineering and data management. Fugro's operations have been organised into three divisions: Geotechnical, Survey and Geoscience.

Fugro is listed on Euronext N.V. in Amsterdam and is included in the Amsterdam Midkap index. Fugro has over 250 offices, about 7,000 staff and a permanent presence in almost 60 countries.



Squalls, because of the abrupt changes in surface winds, can cause operational difficulties. The installation of the Sahna jacket (above) offshore West Africa was delayed for several hours due to the passage of a weak squall.