Marine Forecasting at a glance

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Marine Forecasting Centre
http://met.no/**mfc**

Classic Norwegian Cyclone Model

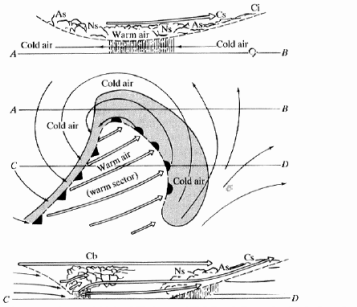


Figure 5.8 The wave cyclone model (after J. Bjerknes and H. Solberg). Center drawing, horizontal plane view; top, vertical cross-sectional view just north of wave apex (line *AB*); bottom vertical cross-sectional view across warm sector (line *CD*). (For abbreviations of cloud-type names, see section 2.1; arrows depict air flow.)

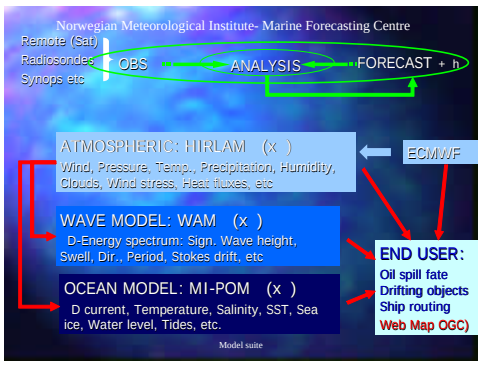
History

Since the early days of Vilhelm and Jack Bjerknes' work in the 'Bergen school of meteorology', weather forecasting has been a priority in Bergen, Norway. Our long coastline, and the adjacent sea areas, the North Sea and the Norwegian Sea, have always been exploited for their natural resources and hence densely trafficked. Nevertheless, this rough seaway has always been a threat to human life in bad weather. When the Norwegian Meteorological Institute was established in Bergen in 1928**,** marine weather had to be the main focus. Traditional weather forecasting for fisheries became regular since then. In the early 1970's oil exploration and production became an important industry in Norway, and site specific marine forecasting and 1st generation contingency services were implemented.

In the early 1990's, the demand for further specializing into marine forecasting was evident, and in 1996 the Marine Forecasting Centre at met.no (MFC) was established. Our main aims are to use the best available numerical model output and marine observations, do maximum value adding and present the results in a user friendly and innovative way through use of new technology. To fulfil these aims, MFC modernised production, focused on product development for end users and encouraged scientific development within marine weather such as contingency models, extreme waves, and current measurements.

Operational/contingency services from MFC:

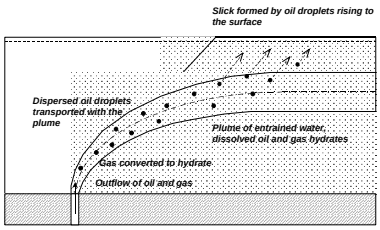
Numerical suite



met.no's numerical model suite is the basis for a number of services from the Marine Forecasting Centre, al in the context of **'Safety at Sea'** :

?? Site specific offshore forecast (24hrs/7weekdays)
?? Numerical weather information and graphics
?? Hindcast data and maritime observations
?? Meteorologist for dedicated forecasting
?? Contingency services: SAR, oil, ship
?? Ship routing (C-Star)
?? Consultancy services, i.e. Ekofisk Extreme Wave Forecasting or Current radar measurements
?? Projects founded by EU, ESA, Norwegian Research Council or by end useers

DeepBlow



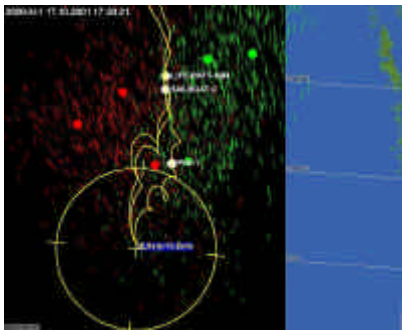
Simulation of oil drift has been an ongoing activity at the Norwegian Meteorological Institute since the 1970's. The first oil drift model predicted the oil drift mainly by use of empirical formulas; current and wave data were estimated from the surface winds only. In 1994 the oil drift model was upgraded to use current and wave data, and changes in mass of oil and emulsion are computed. Results are standardised, and ready to present, e.g. in a Web-Map system.

Oil companies now drill for oil at deep water, e.g. down to 2000m. In response to this Norwegian oil companies have supported a deep-sea blow out model development at SINTEF Applied Chemistry. This project lead by dr. Øistein Johansen, has resulted in the new **DeepBlow model**. This model is based on the Lagrangian concept to facilitate the introduction of processes that are important at great depths:

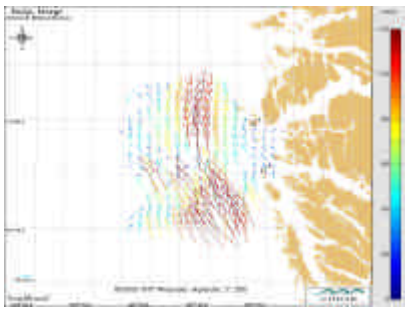
?? Hydrate formation
?? Dissolution of gas in water
?? Deviation from ideal gas behaviour
?? 64 types of oil can be simulated

DeepBlow takes into account effects of cross flow as well as the effects of stratification in the ambient water

LeeWay and HF radar



Further info at: http://leeway.met.no



Further info at: http://hf.met.no

Marine Forecasting in coming years

In the next years the information flow will increase rapidly, and the challenge will be how to extract the most relevant met-ocean information, integrating it with other relevant geographic information and presenting this in a most synergic and proper way.

On board (Thick client)

The Master will probably not want another information system on board, and it may even be a safety risk. The best is to get condensed new information presented in your main existing information system; the navigational system.

MFC has taken this into account, and has together with C-MAP Norway developed an information system on top of the electronic navigational chart (ECS/ECDIS). In the first phase weather and sea state information, cyclone warnings and weather routing are presented on top of C-MAP's sea charts already available at many bridges. A stand-alone solution for ship routing is available; the C-Star. In the second phase, we will look into all kind of geographical information relevant for mariners, and also look into better distribution solutions.

C-Star

On shore (Thin client)

If the connection to Internet is a cost effective high speed connection, you may probably profit of a tailor made internet service; a 'GIS (Geographical Information System) – on web – solution'. MFC now develops, together with expertise in web presentation, a web-map-system which will allow everyone with a proper nternet connection to download all relevant information in their web browser. Effort has been made to make this system as easy as possible; all you need is a standard web browser (like Microsoft's Explorer). This web-map service may be further built out with functionality depending on the end users needs. You may also place the MetOc server onboard, and download the data to the server. Then you only need a fast intranet on board.