Visualization at SMHI

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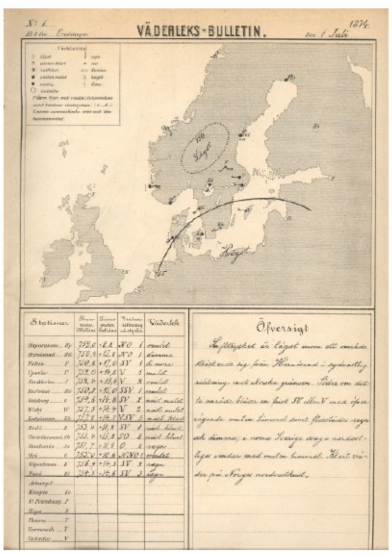
Abstract

Like most other national weather services the Swedish Meteorological and Hydrological Institute (SMHI) was established in the late 19th century. The reason for this was the development of the telegraph. In order to make a weather forecast one need information about the current weather situation within a large area and the telegraph made this possible. As an illustration, todays 24 hour weather forecasts for Sweden use information from all of Europe, the northern Atlantic as well as the eastern parts of northern America.
Accordingly SMHI gathers vast quantities of data around the clock from land-based weather stations, balloons, ships, buoys, aircraft, weather radar, satellites and lightning localization systems. This information is the base for further processing in complex numerical models, tailored for applications in meteorology, hydrology and oceanography (MHO).



Left: First public weather bulletin from SMHI in 1874. Right: Modern TV weather presentation with superimposed radar image sequence.

SMHI operates under the auspices of the Swedish Ministry of the Environment and uses its MHO expertise to promote efficiency, safety and a better environment. In order to do this forecasts, severe weather warnings and other model results need to be analyses, presented and visualized in ways that meet the specific needs of a wide spectra of audiences. These range from researches, developers and forecaster to customers in various areas of society.
Weather information to the public has for a long time been an important task as illustrated in the figure above. This talk will serve a smorgasbord with several examples of how visualization techniques are used at SMHI. It will become evident that although the processes in the atmosphere and ocean take place in four dimensions almost all visualizations at SMHI are done in 2-D. Some possible reasons why this is the case will be discussed in the talk.

Speaker Bio

Tomas Landelius is a research scientist at the Atmospheric research group at SMHI where he applies his knowledge in multidimensional signal analysis, non-linear regression, optimal control and optimization to a diversity of problems: Assimilation of satellite micro wave data in weather prediction models (NWP), analysis of satellite cloud images and radar imagery as well as the development of solar radiation models for the UV, visible and near-infrared.

His graduate work concerned the development of a novel algorithm for reinforcement learning in high-dimensional signal spaces and he also made contributions concerning the use of canonical correlation in image analysis applications. He received his M.Sc. in Computer Science and Technology (1990) as well as his Ph.D. in Computer Vision (1997) from Linköping University, Sweden.