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Characteristics of the sea breeze cell at the Finnish South Coast – Case study using HTB data

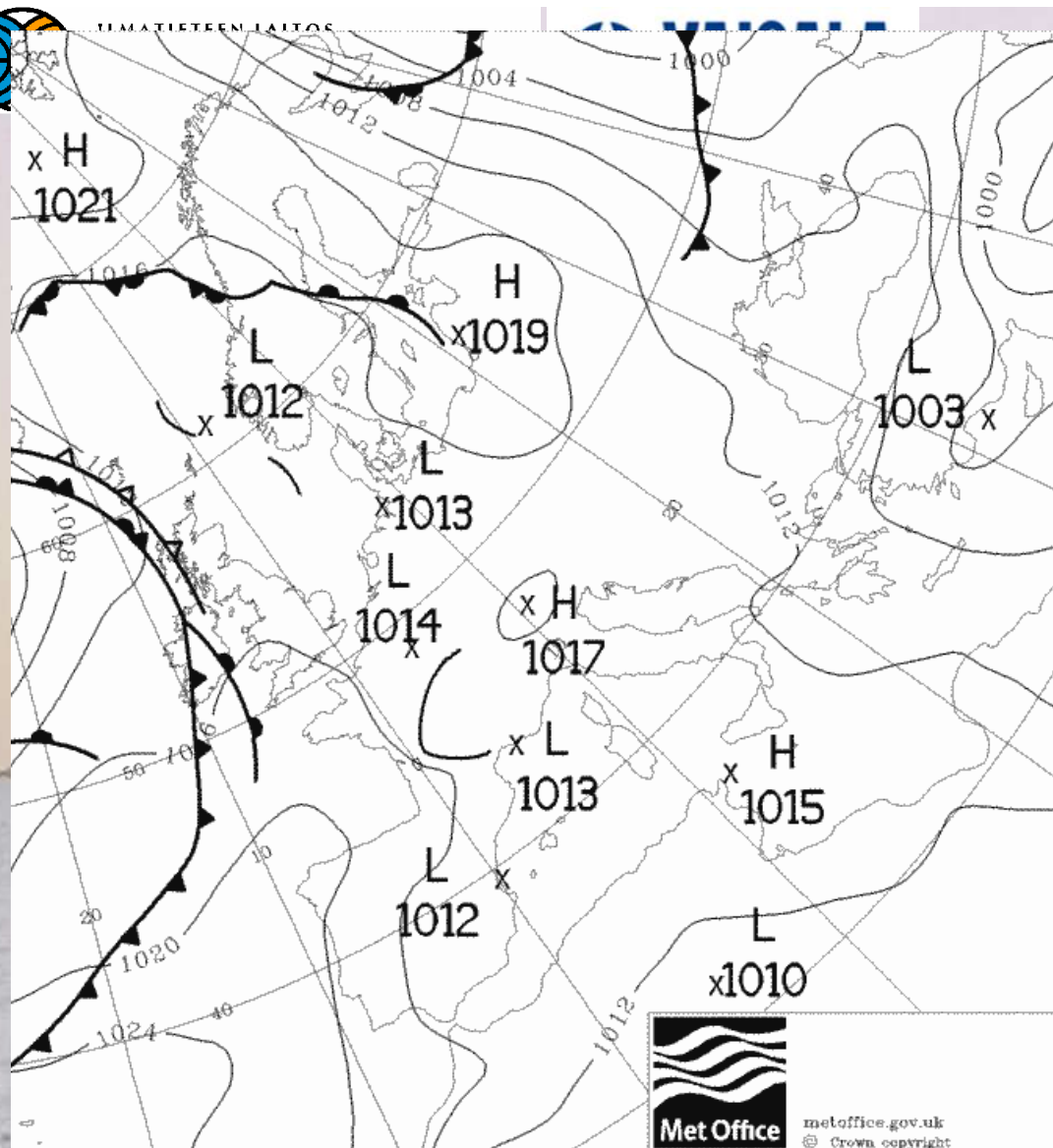
Testbed course 2007 C. Helenelund and R. Hyvönen



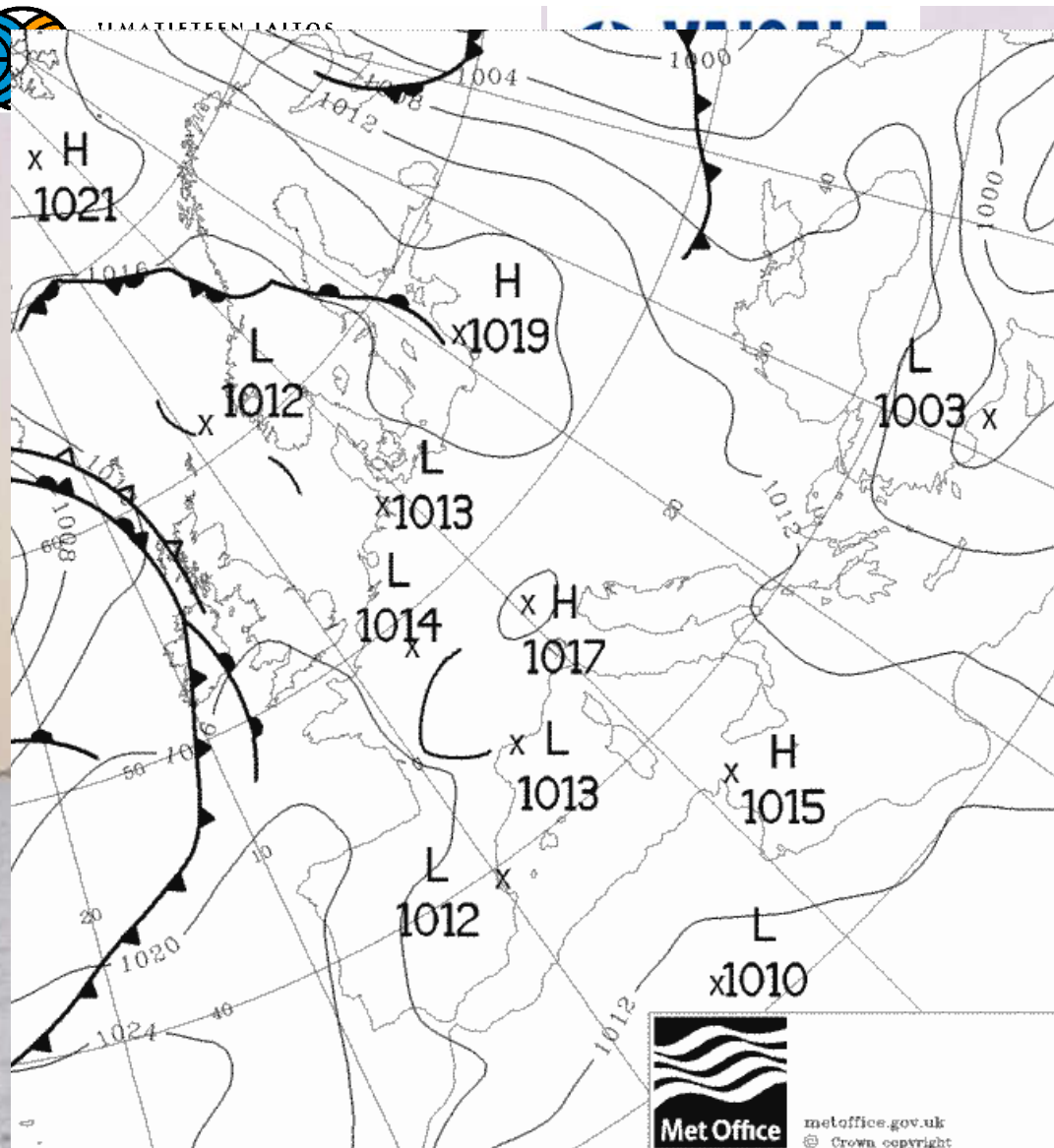
Objectives:

To study a typical summer day with sea breeze:

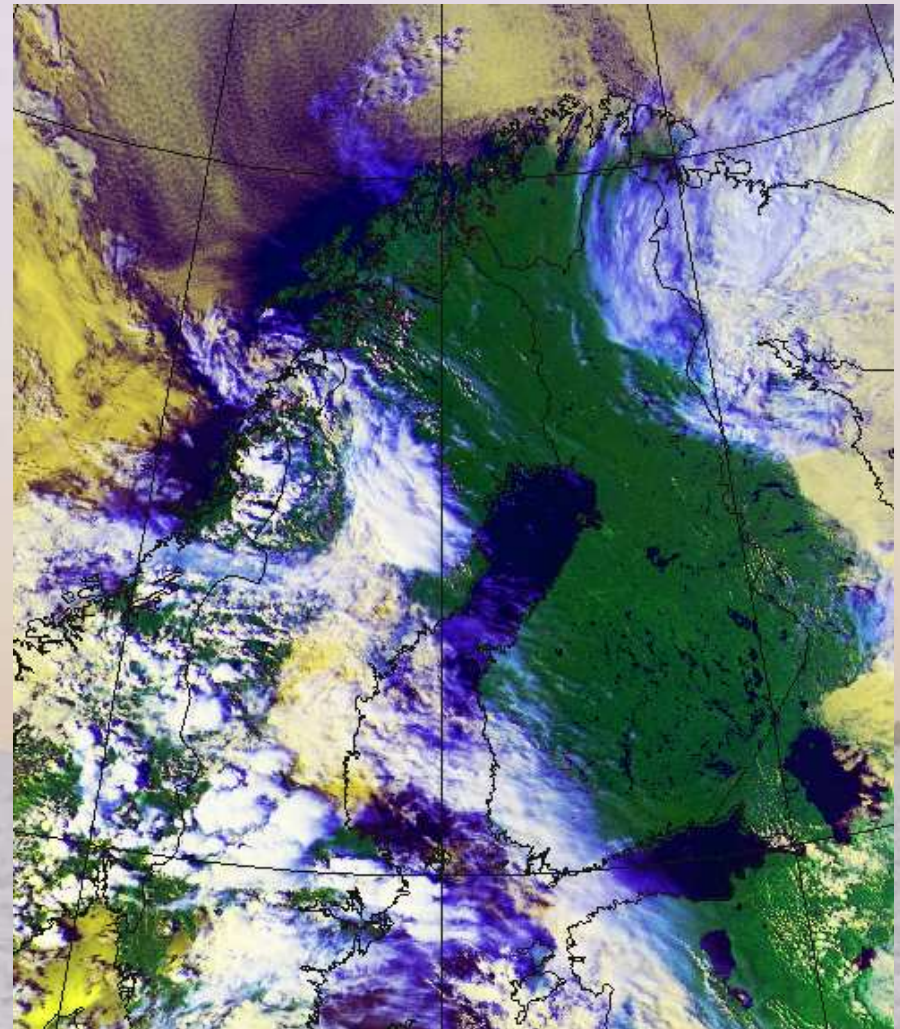
- by using measurement data available from HTB
- To characterize and clarify the general development of the sea breeze cell
- To evaluate how well data from the various instruments can be used for studying sea breeze (only dealt with in the report)



Analysis chart 28.7.2006 00 UTC



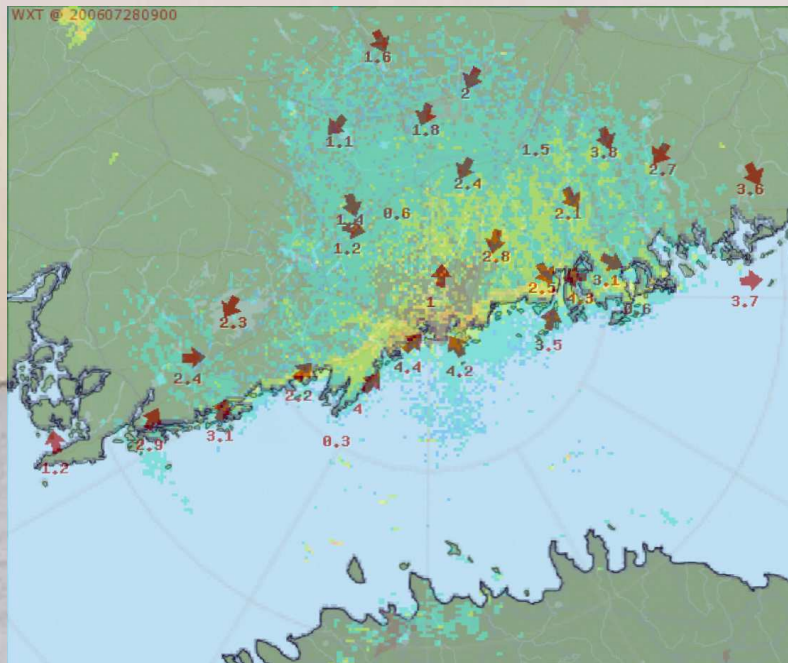
Analysis chart 28.7.2006 00 UTC



NOAA image 28.7.2006 14 UTC

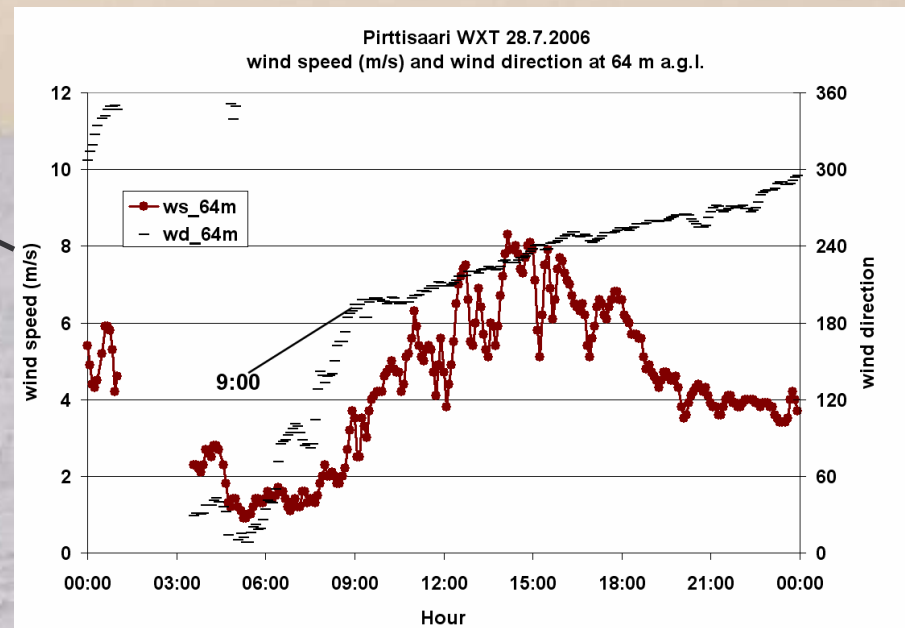
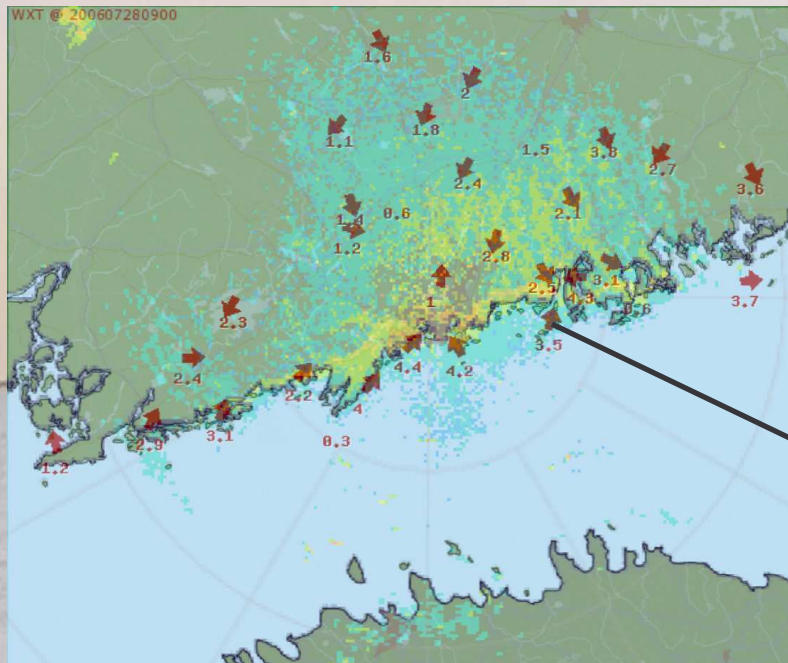


Vantaa radar 09:00 UTC (11 local solar time)

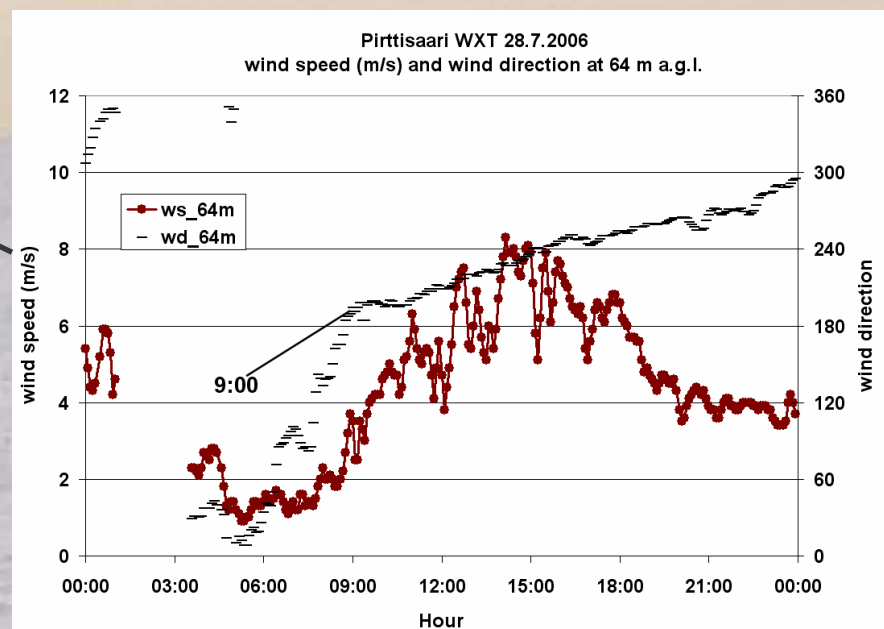
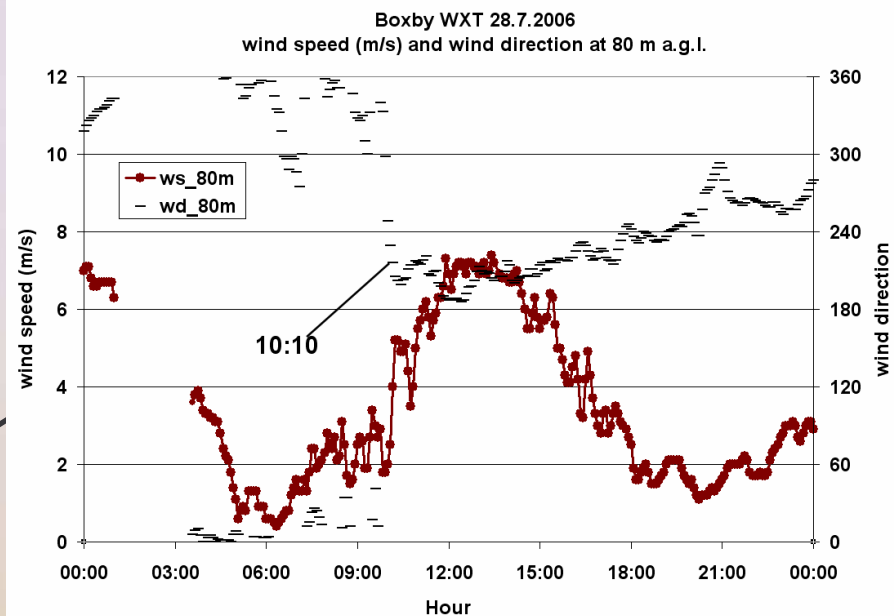
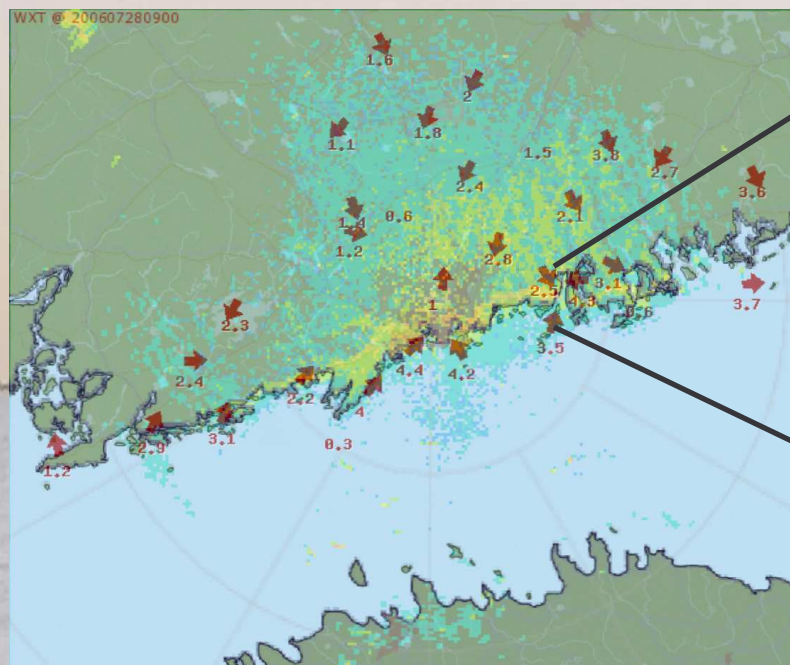




Vantaa radar 09:00 UTC (11 local solar time)



Vantaa radar 09:00 UTC (11 local



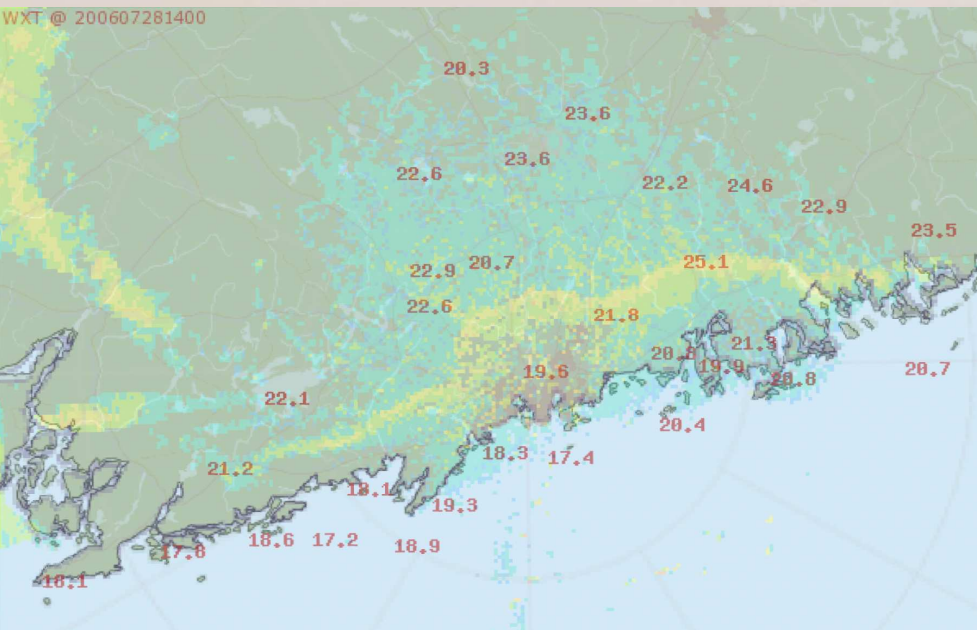
AISSALA



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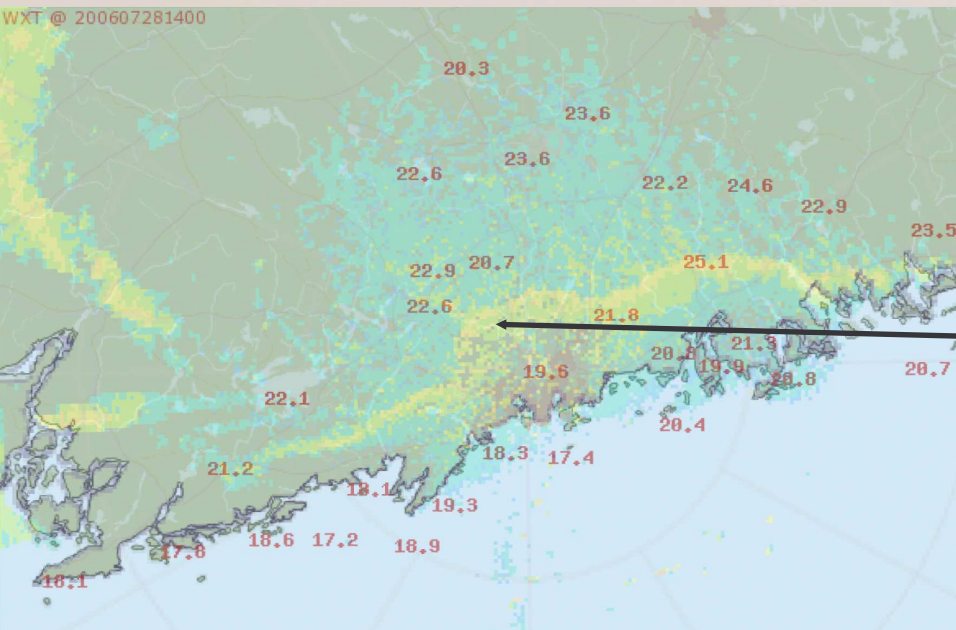


WXT 2 m temperatures 14:00 UTC Vantaa radar 14:00 UTC

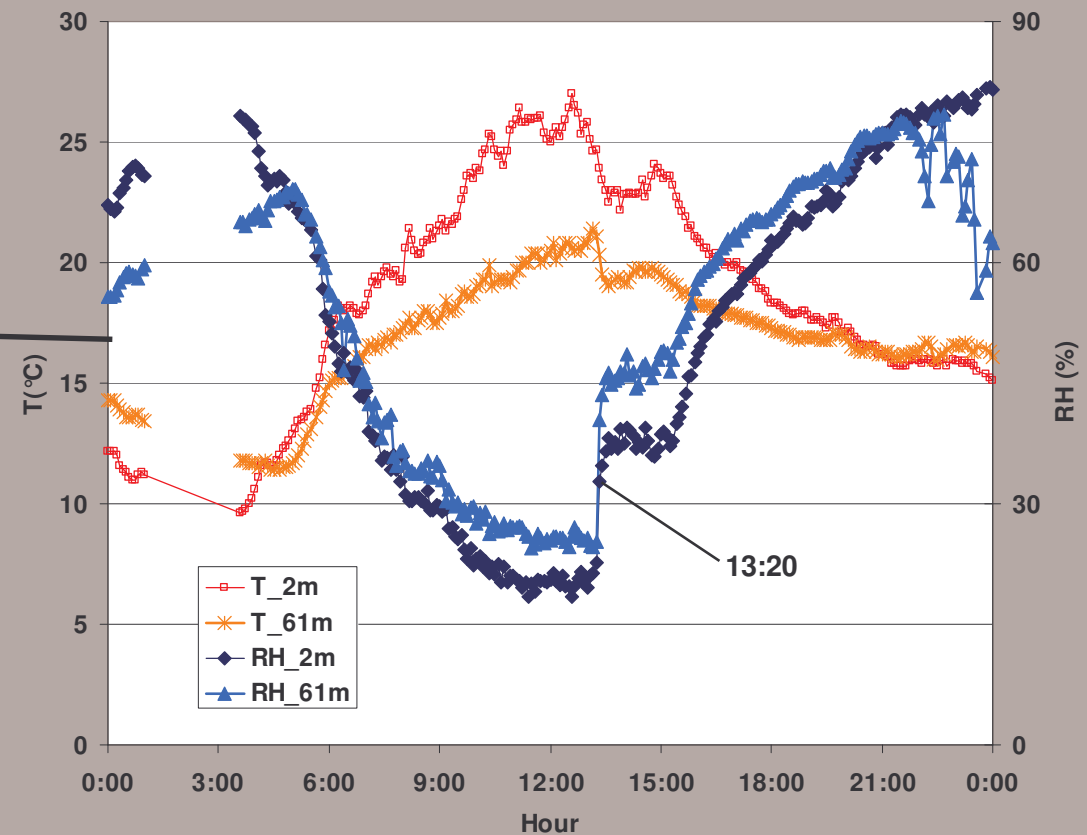




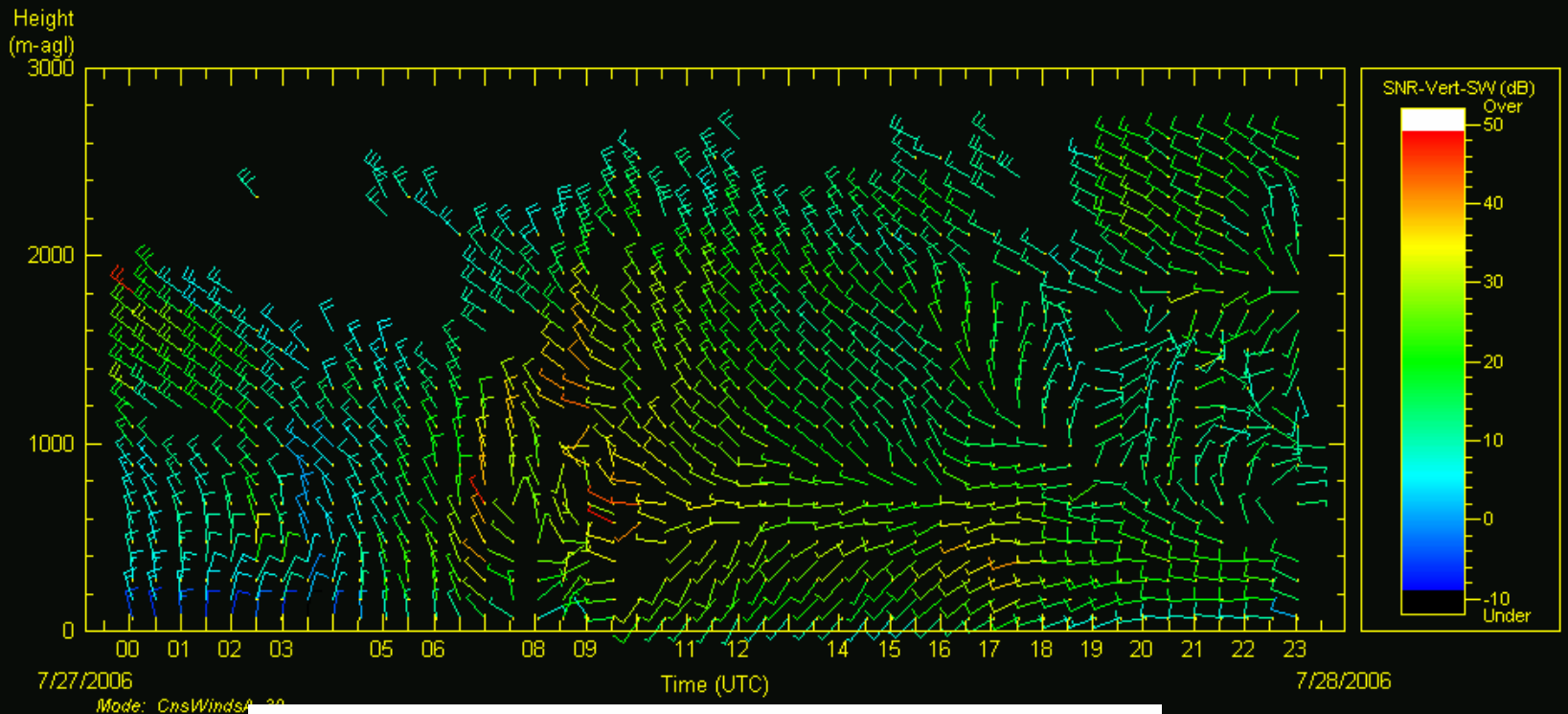
WXT 2 m temperatures 14:00 UTC Vantaa radar 14:00 UTC



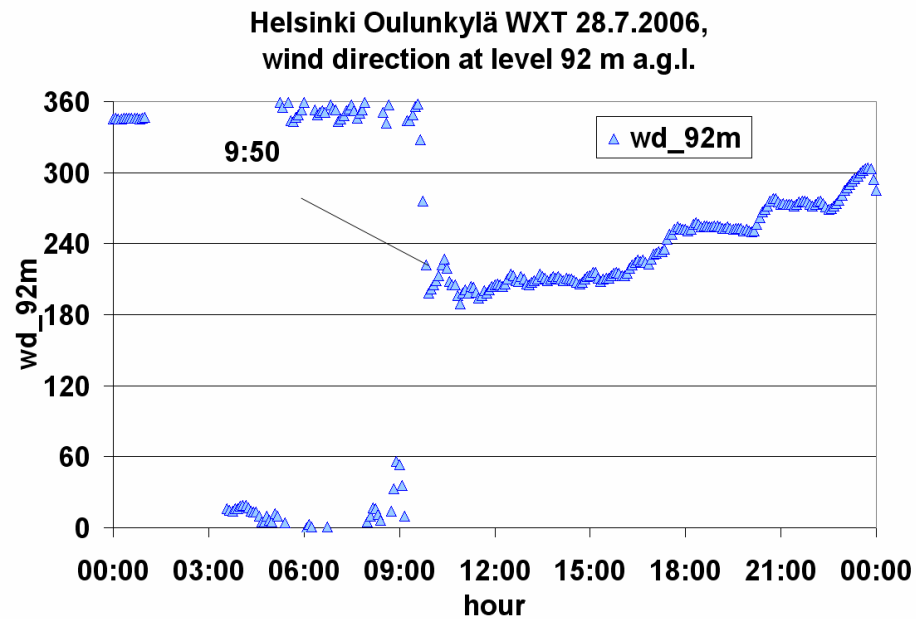
Vantaa Luhtaanmäki WXT 28.7.2006



Malmi wind
profiler,
28.7.2006



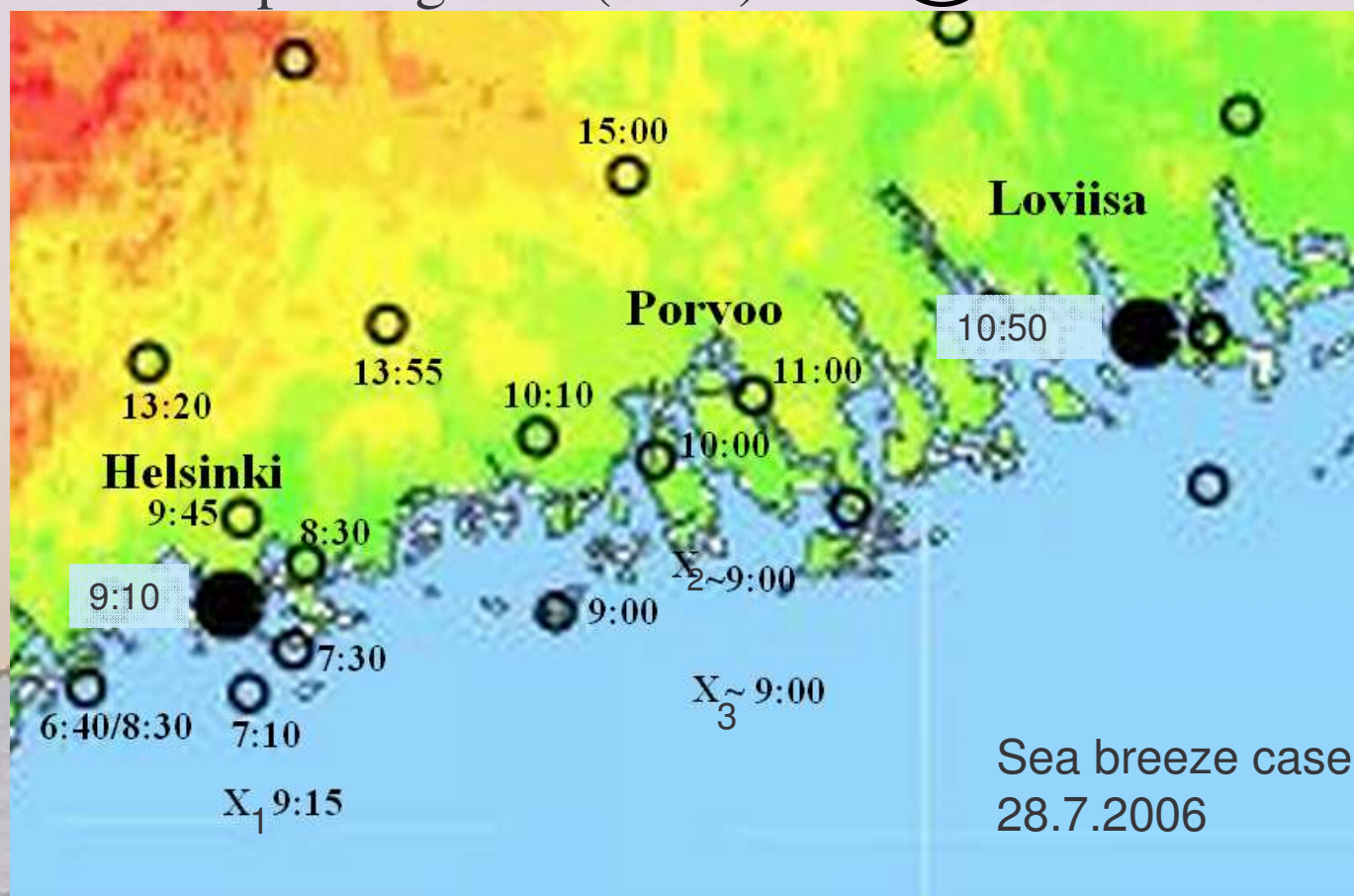
Oulunkylä WXT,
5 km W from Malmi



Sea breeze front passing time (UTC)



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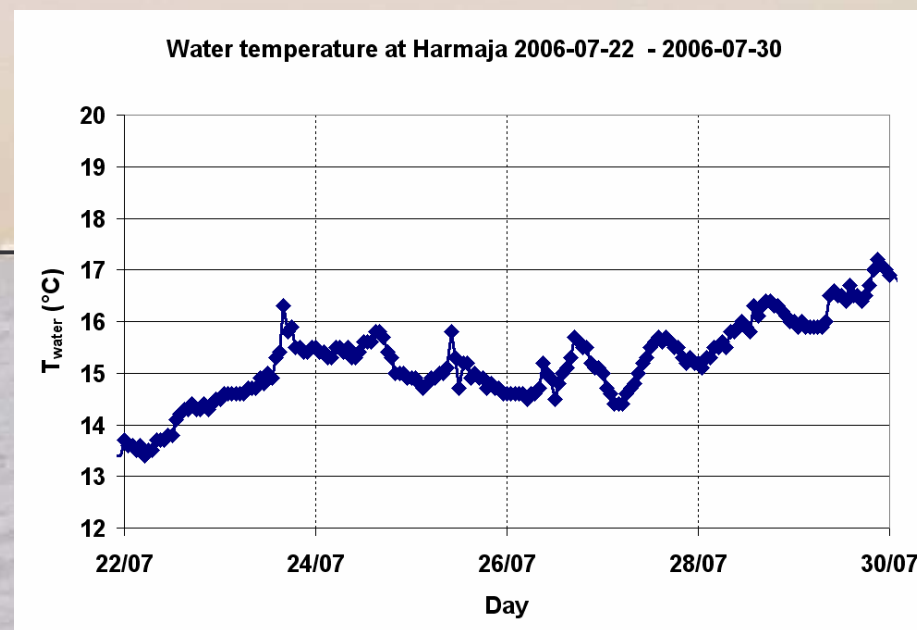
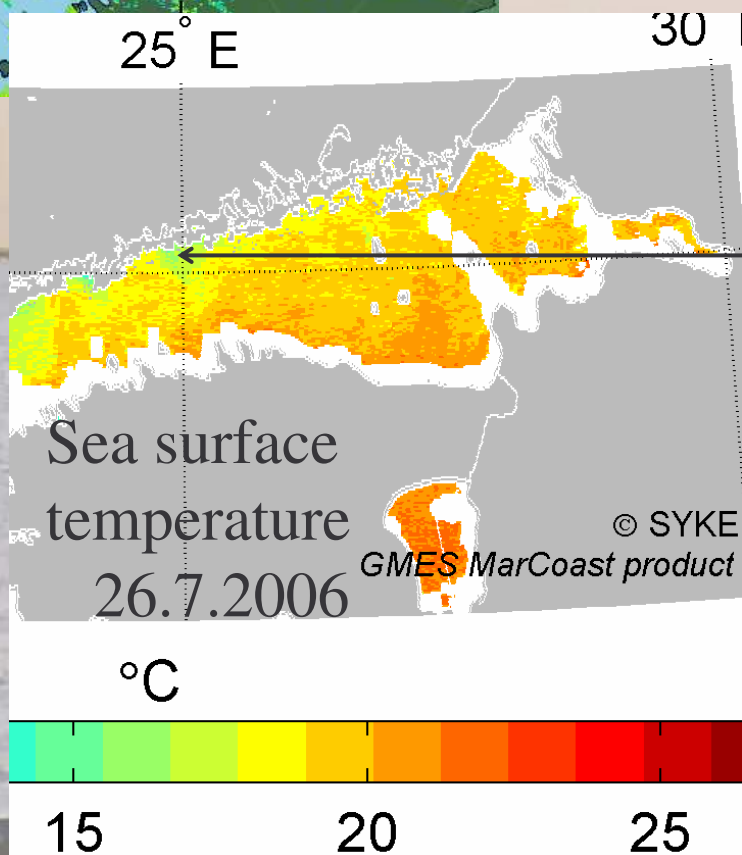
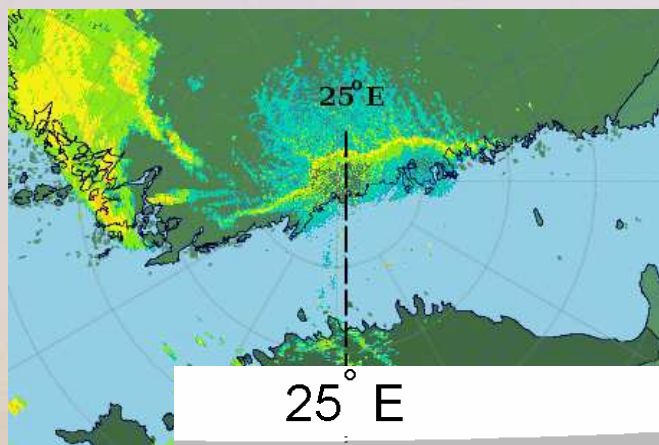


- Special masts (Stadium tower, Loviisa weather mast)
- X FMI/AWS 1)Helsingin Majakka 2)Emäsalo 3) Kalbådagrund
- Unibase mast with WXT

Vantaa radar 14:00 UTC



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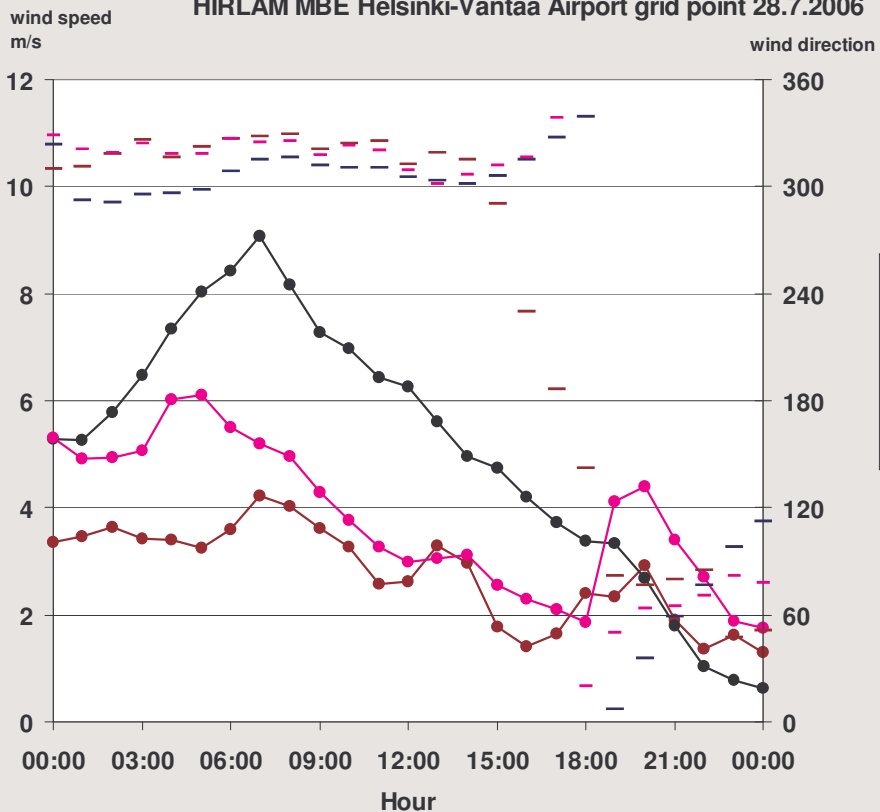




Conclusions :

- All ingredients for sea breeze available 28.7.2006:**
 - ✓ weak northerly geostrophic wind (330° , 5 – 9 m/s)
 - ✓ insolation mostly high (some cumulus clouds appeared)
 - ✓ temperature differences between sea and land 5 – 9 ° C
- Radar could see the front because of insects and birds in the upstream**
- Wind speed and direction changes are easy to recognise from the WXT data from affected areas**
- Sea surface temperature deviation just outside of Helsinki have an effect on the strength and size of sea breeze cell**
- The HTB data has turned out to be very useful when analyzing this kind of sea breeze cases**

HIRLAM MBE Helsinki-Vantaa Airport grid point 28.7.2006



HIRLAM MBE Isosaari gridpoint 28.7.2006

