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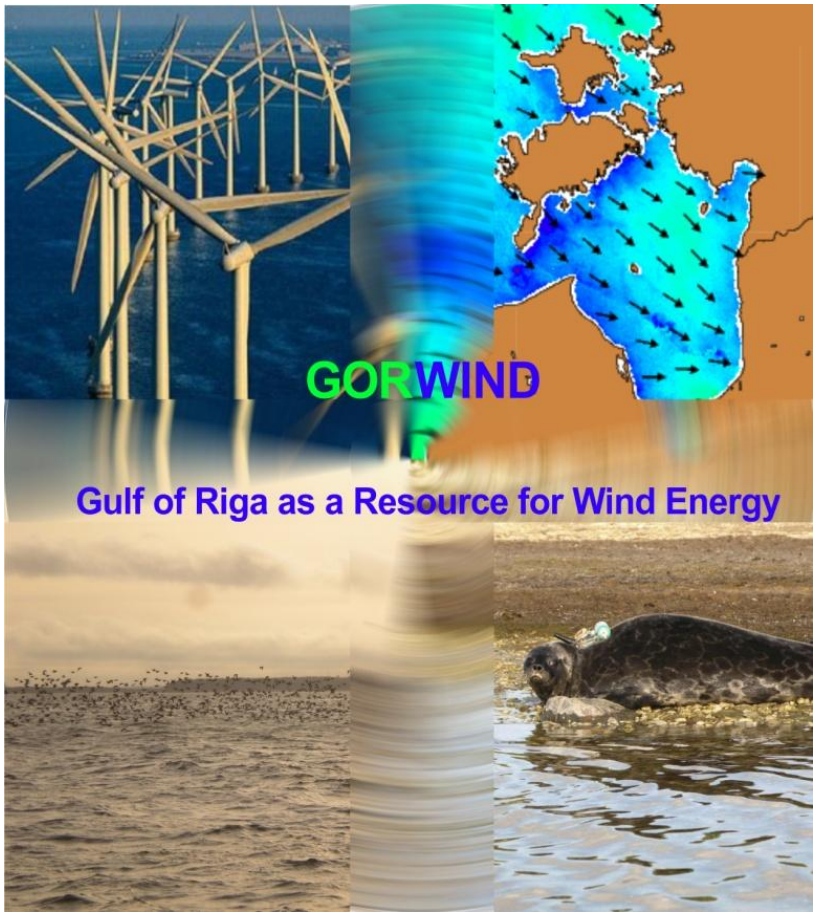
WP 2: HIRLAM analysis



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Outline

- Data overview
- Some results
- Summary and future work

Data overview: what is this data?

HIRLAM (2006-2010):

- HIRLAM (HIgh Resolution Limited Area Model)
- Horizontal resolution 11 km, data available from 60 hybrid levels; temporal resolution: 3 hours prognosis is made 54h ahead 4 times per day. Eventually, we will use best available prognosis: 3h forecast data from each calculation.

Re-analysis (2000-2005):

- Calculations made with HIRLAM v 7.1.4 by University of Tartu
- Horizontal resolution 11 km, vertical resolution 60-layers.
- Standard surface observations and meteorological soundings together with ship and buoy measurements from WMO observational network data is used in re-analysis (Luhamaa et al 2010). 6-hour forecasts are made at each analysis cycle.

Data overview:

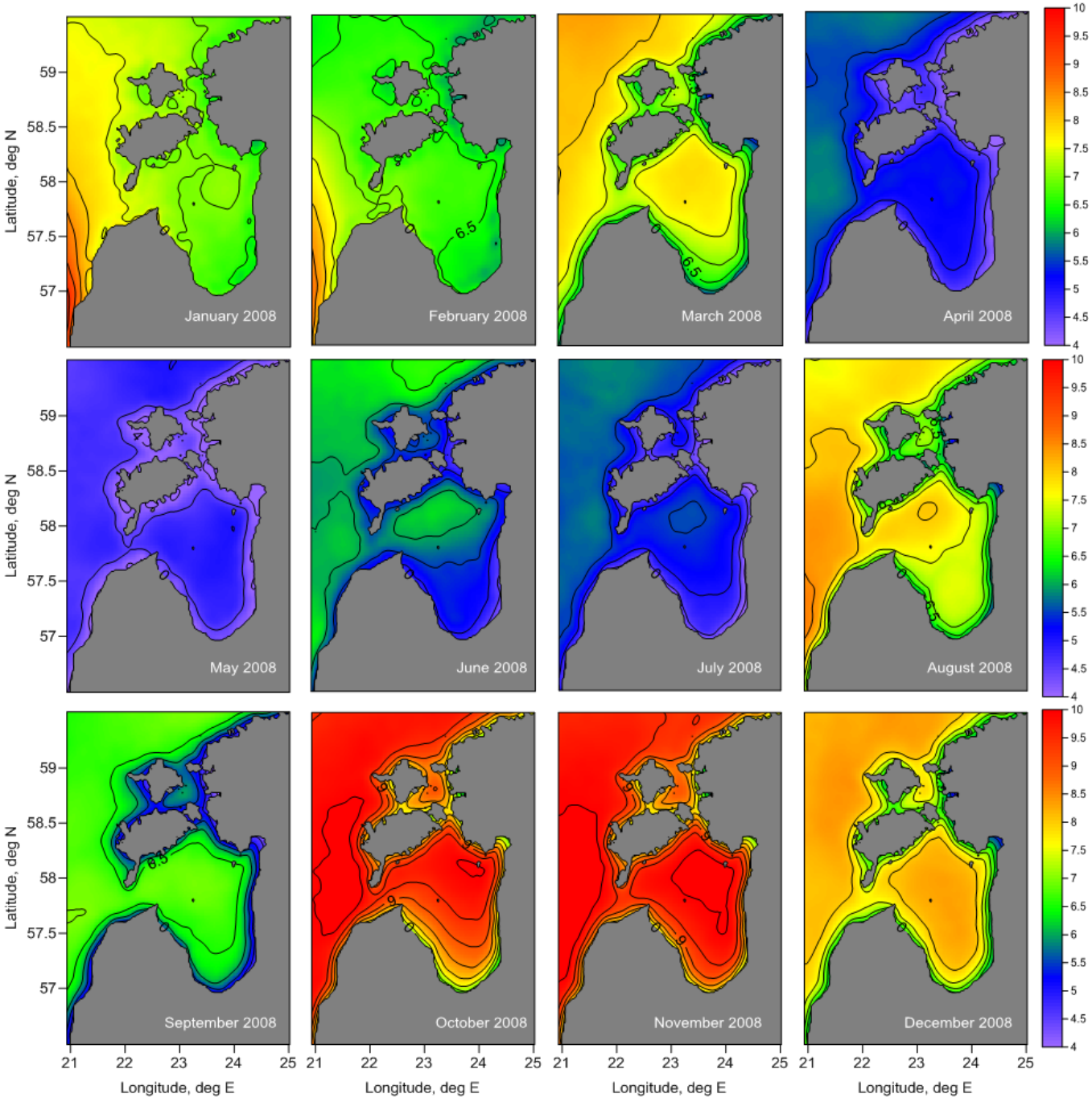
We have 100% of 6h data available for period 2002-2005 and changing coverage for 2006-2010.

Year	Nr. of 6h fields	Percentage (%)	Nr. of 3h fields	Percentage (%)
2002	1460	100.0%	none	-
2003	1460	100.0%	none	-
2004	1464	100.0%	none	-
2005	1460	100.0%	none	-
2006	1395	95.5%	2790	95.5%
2007	1035	70.9%	2070	70.9%
2008	1351	92.3%	2702	92.3%
2009	1441	98.7%	2882	98.7%
2010	1432	98.1%	2864	98.1%

Data overview: parameters to retrieve

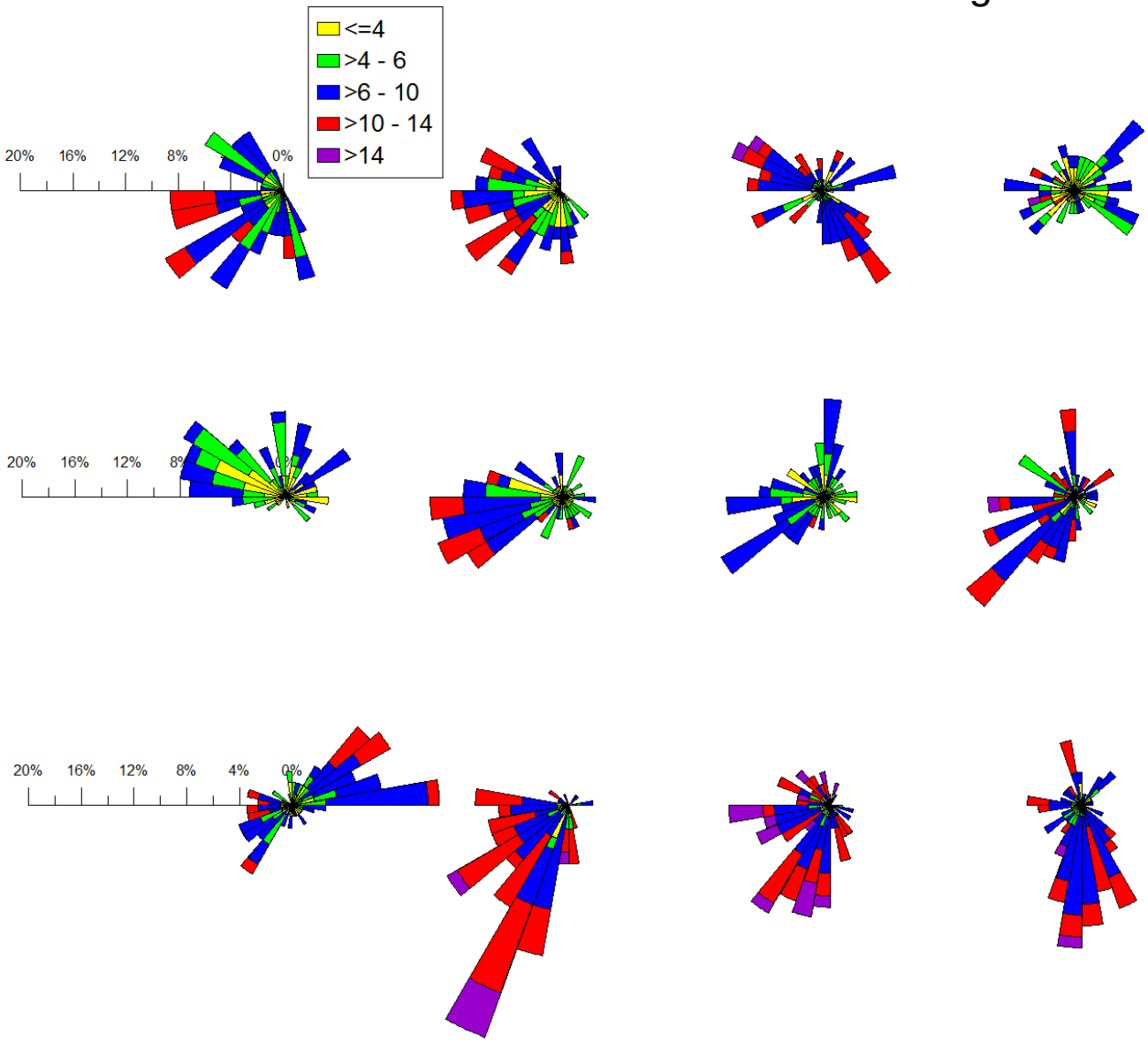
From HIRLAM model, we would like to get the parameters for 2002-2010. So far we have retrieved parameters in blue for 2000-2005 and 2008-2009 with 6 hour resolution. Years 2006-2007 and 2010 are yet to analyze. Also the statistics with 3 hour resolution.

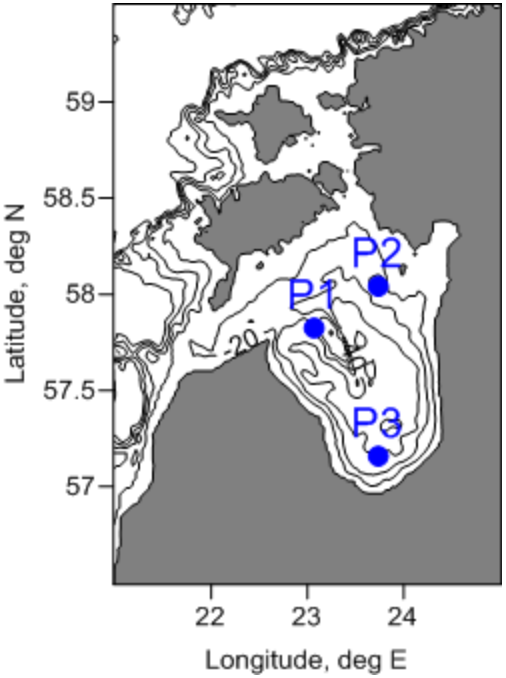
Parameter		Status
1	Mean annual wind speed	2000-2005;2008-2009
2	Weibull distribution parameters	to do
3	Mean monthly wind speeds	2000-2005;2008-2009
4	Mean wind direction from 12 sectors	2008-2009
5	Mean annual air density	to do
6	Mean annual energy density	to do
7	Mean annual temperature	2000-2005;2008-2009
8	Minimum temperature	to do
9	Maximum temperature	to do
10	Days of temp. below -20 C*	2000-2005;2008-2009
11	Mean relative humidity*	to do



Monthly mean wind speed (m/s) at 10m height in the Gulf of Riga during 2008.

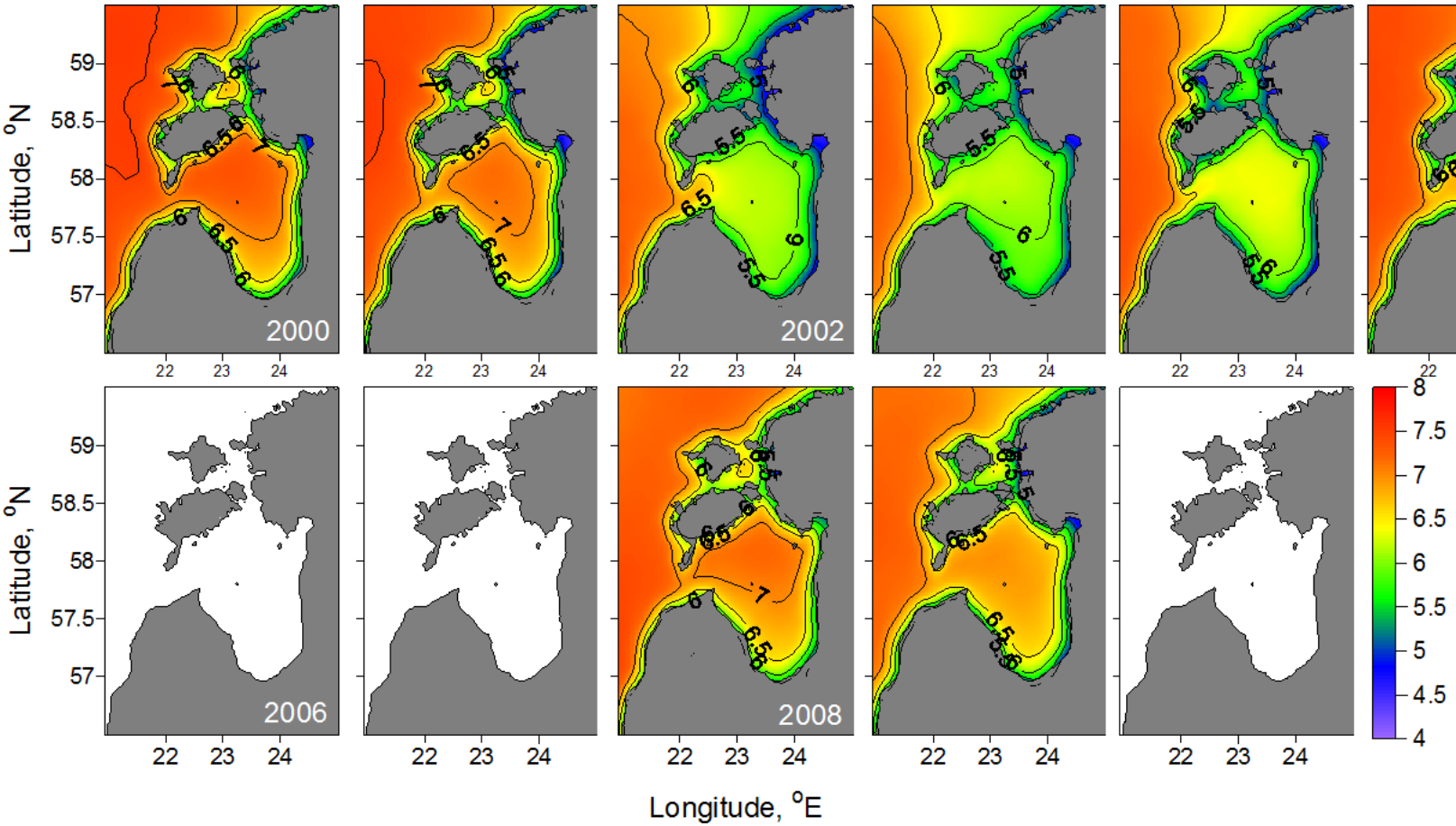
Monthly wind roses in location P1 during 2008





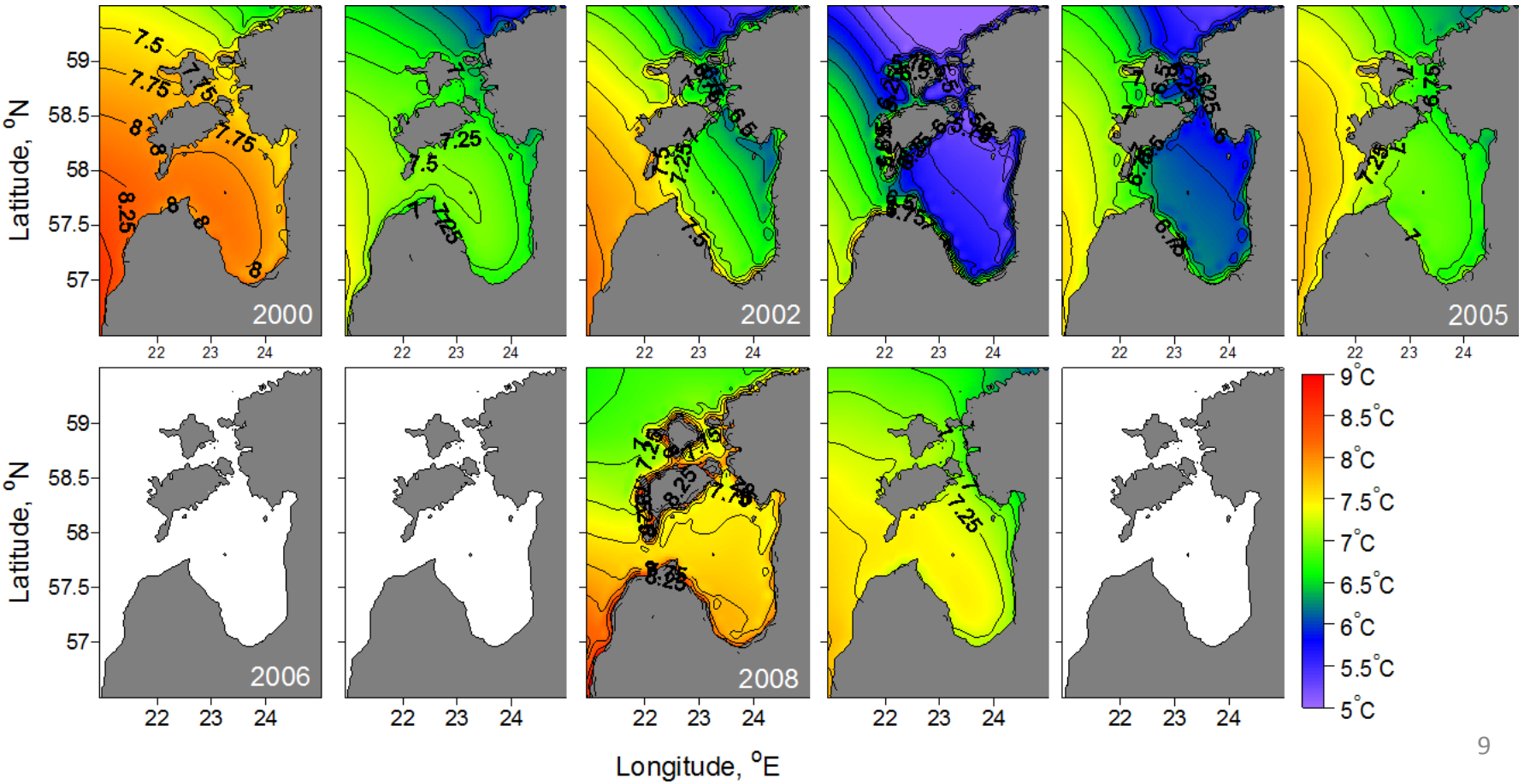
Mean annual wind speeds

Mean annual wind speed is between 6-7 m/s in the Gulf of Riga.

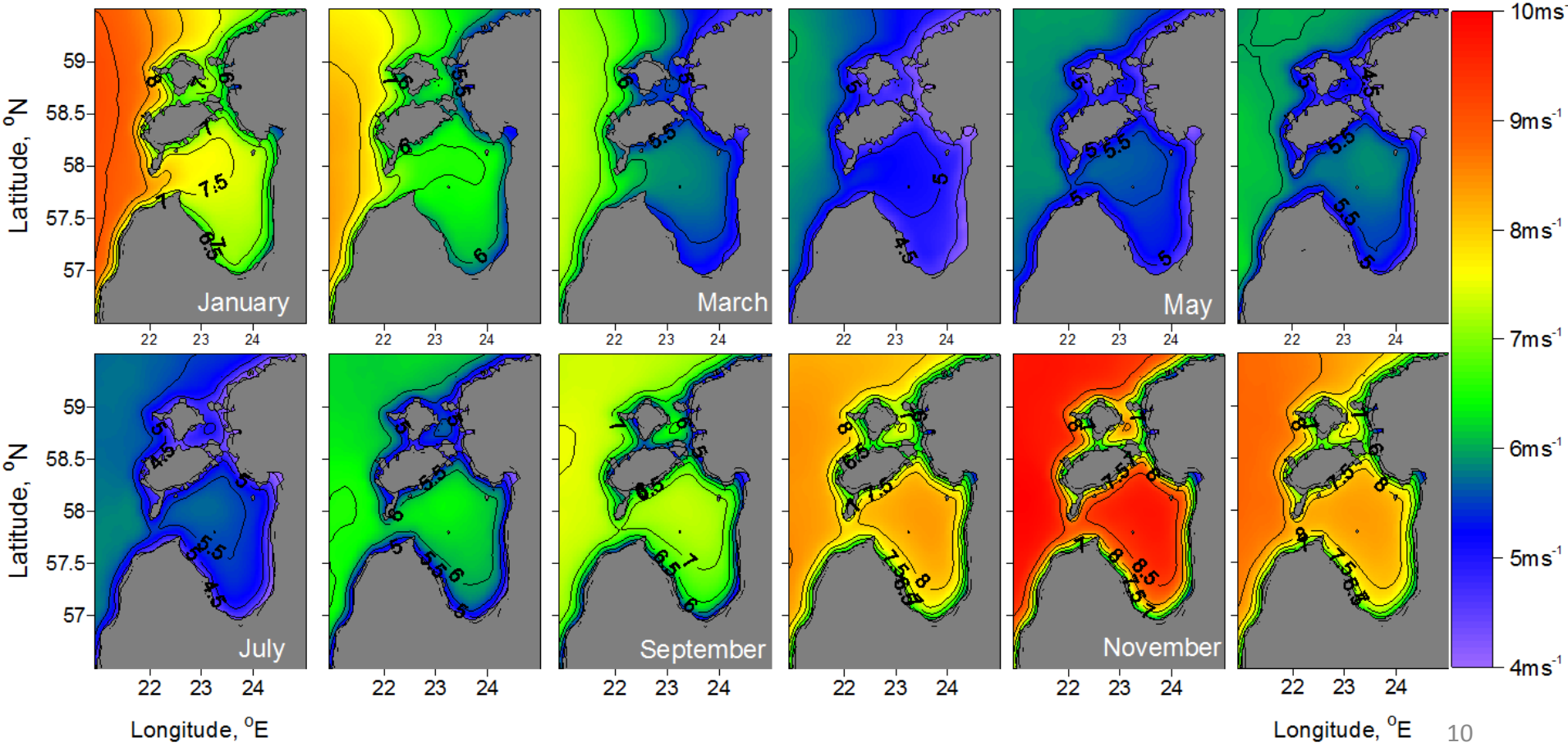


Mean annual temperatures

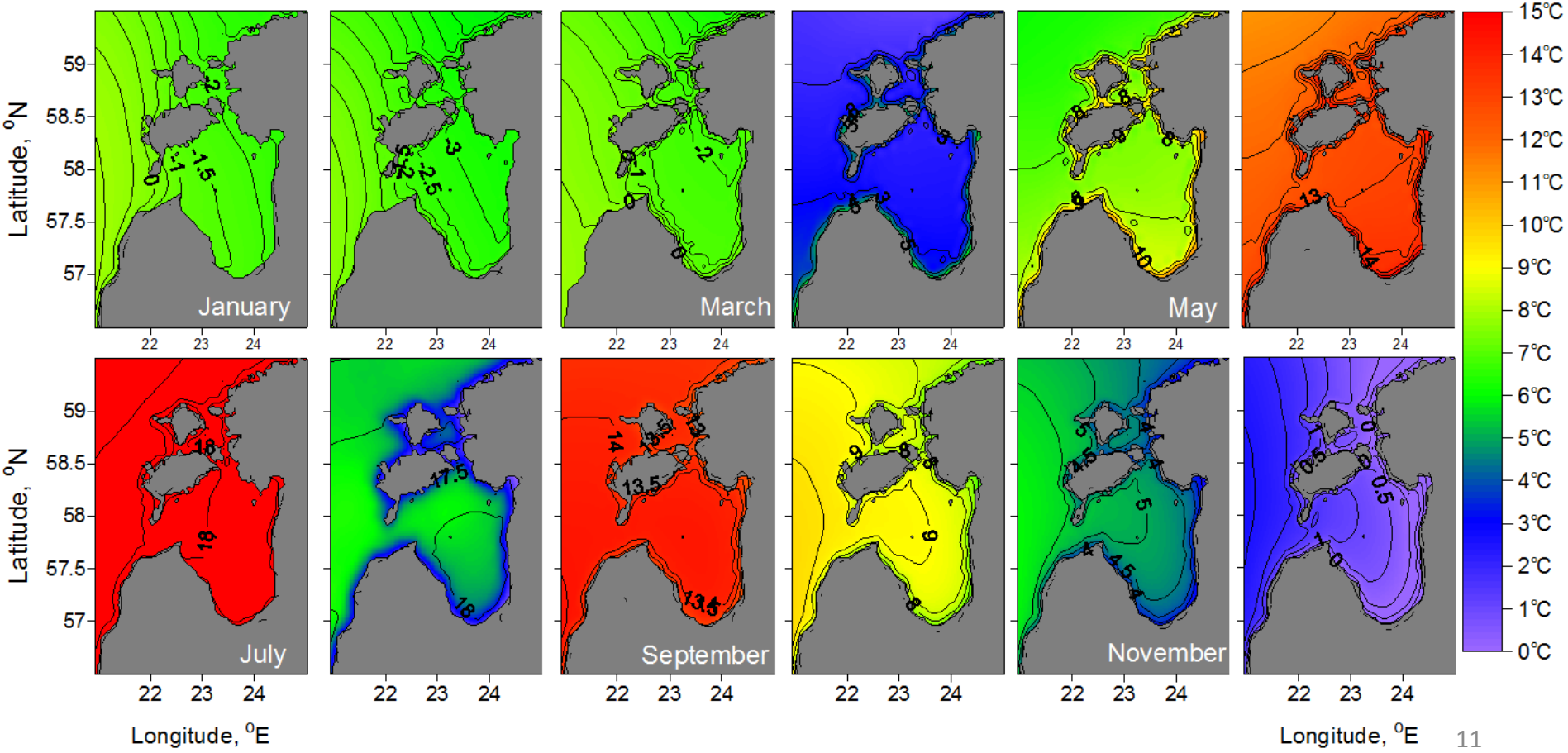
Mean annual temperature is highly variable in the Gulf of Riga.



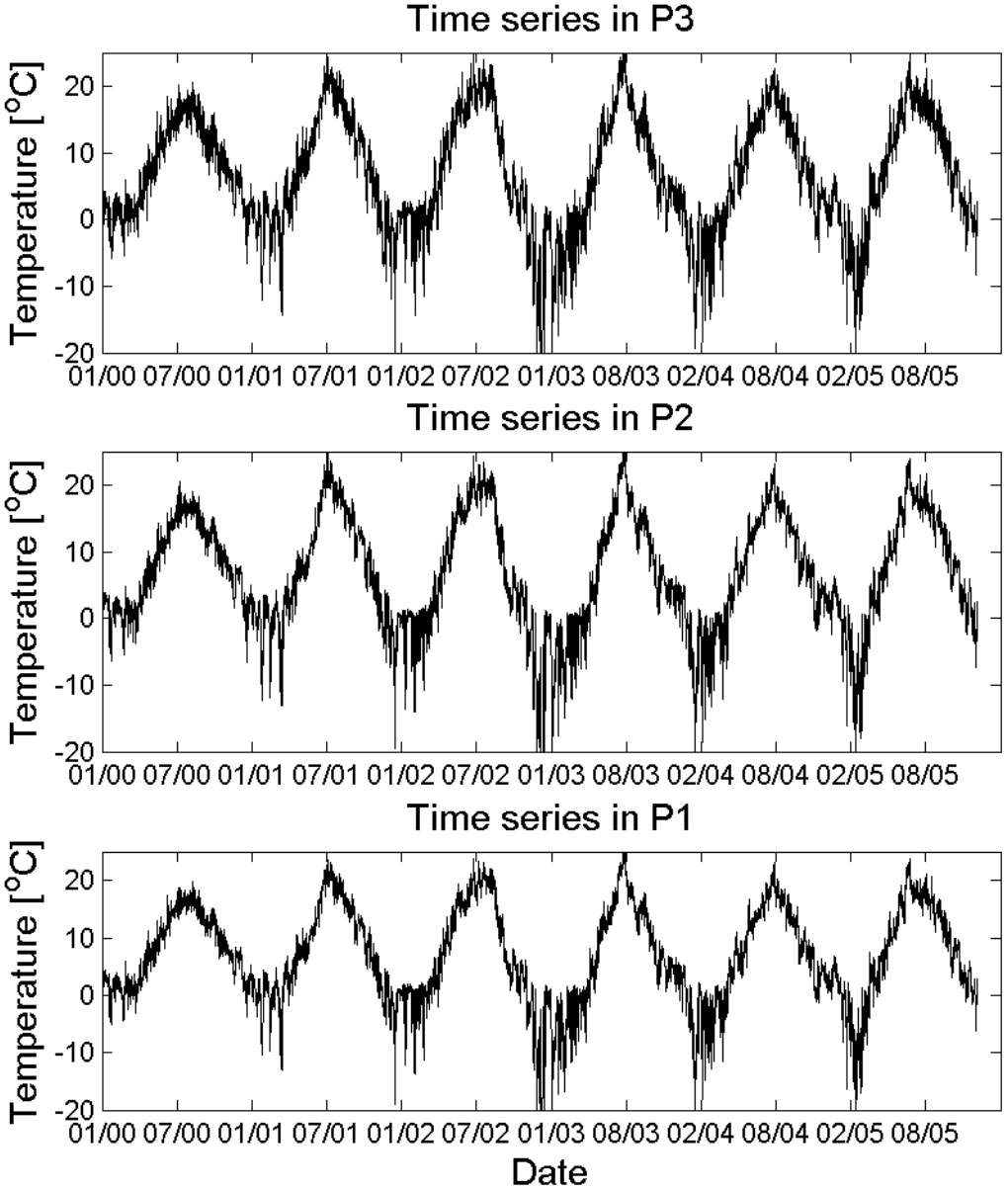
Monthly mean wind speeds over period [2000 – 2005;2008-2009]

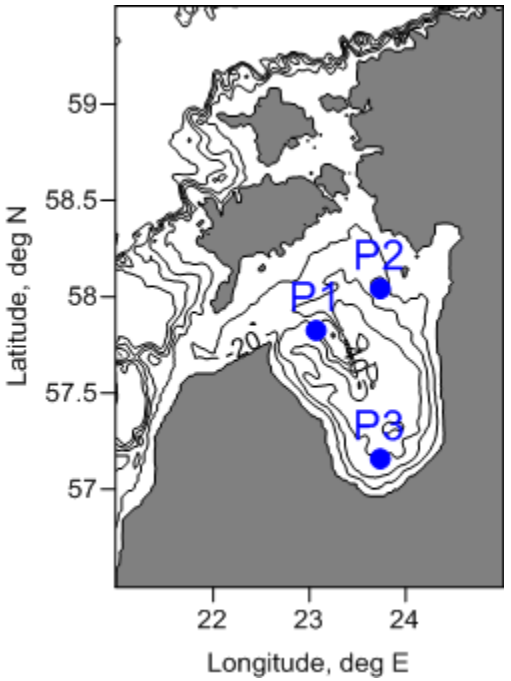


Monthly mean temperatures over period [2000 – 2005;2008-2009]

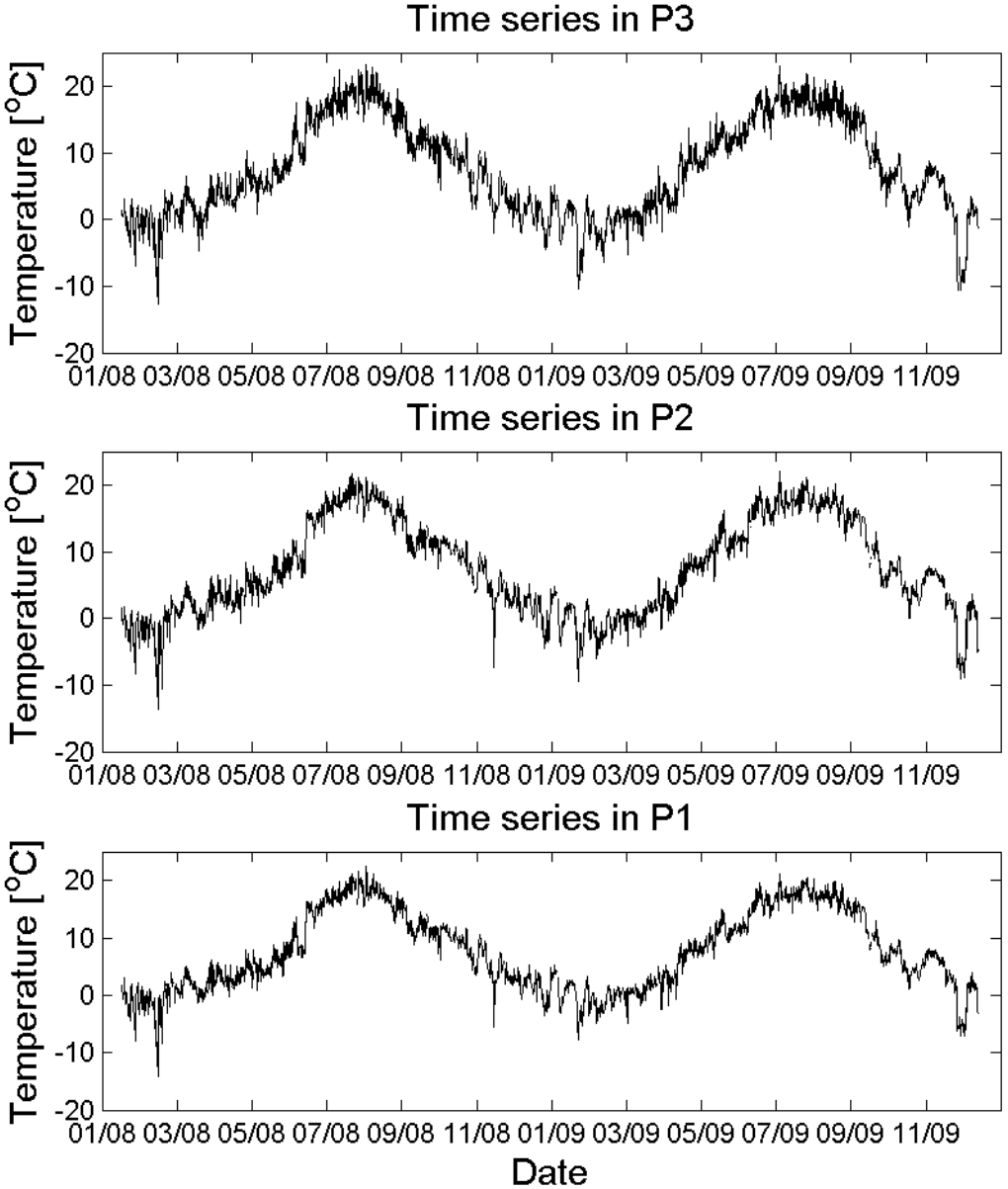


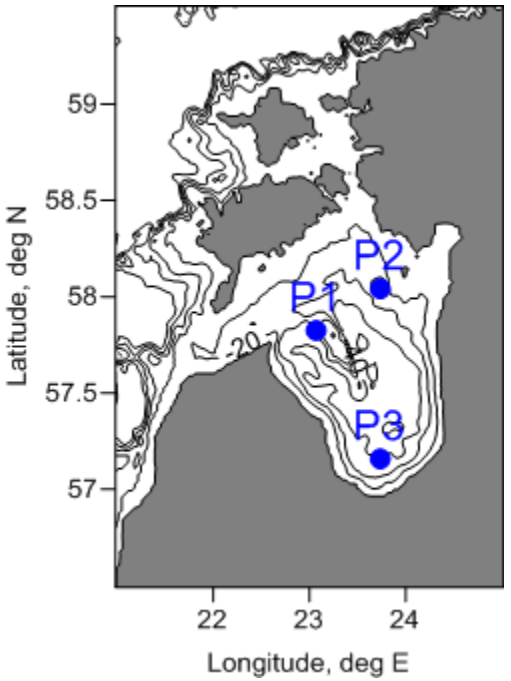
Air temperatures in 2000 - 2005





Air temperatures in 2008 - 2009





Conclusions

- We have collected the atmospheric model data for 2000-2010. The 2000-2005 is covered by re-analysis 6-h data and 2006-2010 by 3-h operational model data
- The mean annual wind speed is 6-7 m/s, value is higher above open waters and lower near shore
- The annual temperature is more variable than annual wind speed in the GoR
- The monthly average is the highest for the November, while the winds are the lowest for March-July
- Monthly mean temperatures are lowest in Feburary and highest in July

Conclusions

- The number of days with temperature below 20°C is (too?) low. Comparison with measurements is needed.
- Future work:

1) Finalize the work so far...

2) Include the data from 1980-... (1965-...).

Overall conclusion:

It should possible to use the HIRLAM data for description of meteorological conditions in the Gulf of Riga over past three decades.

Thank You for the attention!