



European Union

Linking Estonia and Latvia

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# GULF OF RIGA AS A RESOURCE FOR WIND ENERGY

Project #EU34711

Preliminary results of work package II “Wind energy fields and ice conditions” by  
University of Latvia (wind energy fields) and Marine Systems Institute (ice conditions)



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**UNIVERSITĀTE**  
ANNO 1919

# INTRODUCTION

The project objectives are to provide decision makers and potential developers of wind parks in the Gulf of Riga with reliable marine wind information from high resolution remote sensing data, coastal wind measurements and ensemble of Regional Climate models. Wind fields are being complemented with the information on habitat area for seals and wintering, migrating and breeding birds. Local people and authorities are being involved in the active process of selection of suitable areas for wind parks through mapping their attitude and considering the requirements of the areas for renewable energy.

The project partners are Marine Systems Institute at Tallinn University of Technology (MSI, lead partner), Tartu University (TU), Estonian University of Life Sciences, University of Latvia (UL), Latvian Institute of Aquatic Ecology, Latvian Fund for Nature, Estonian Fund for Nature.

The objective of work package II (WP2) is to provide high-resolution maps of relevant wind parameters and ice conditions for the area of Gulf of Riga. WP2 is partnered by MSI, TU and UL (lead partner for WP2).

This document summarises the results achieved in WP2 within 18 months of project.

The wind fields are derived as follows:

1. Contemporary climate corresponds to years 1981-2010 whilst the future climate is assumed as projections for Years 2021-2050.
2. Wind data from Regional Climate models (RCM) summarised in EC project ENSEMBLES are used.
3. The ensemble of RCMs is used selecting median model for each derived parameter.
4. The bias correction of RCMs and enhancement of spatial resolution is performed via original statistical downscaling method. The reference for downscaling is operational HIRLAM operational model by Danish Meteorological Institute.

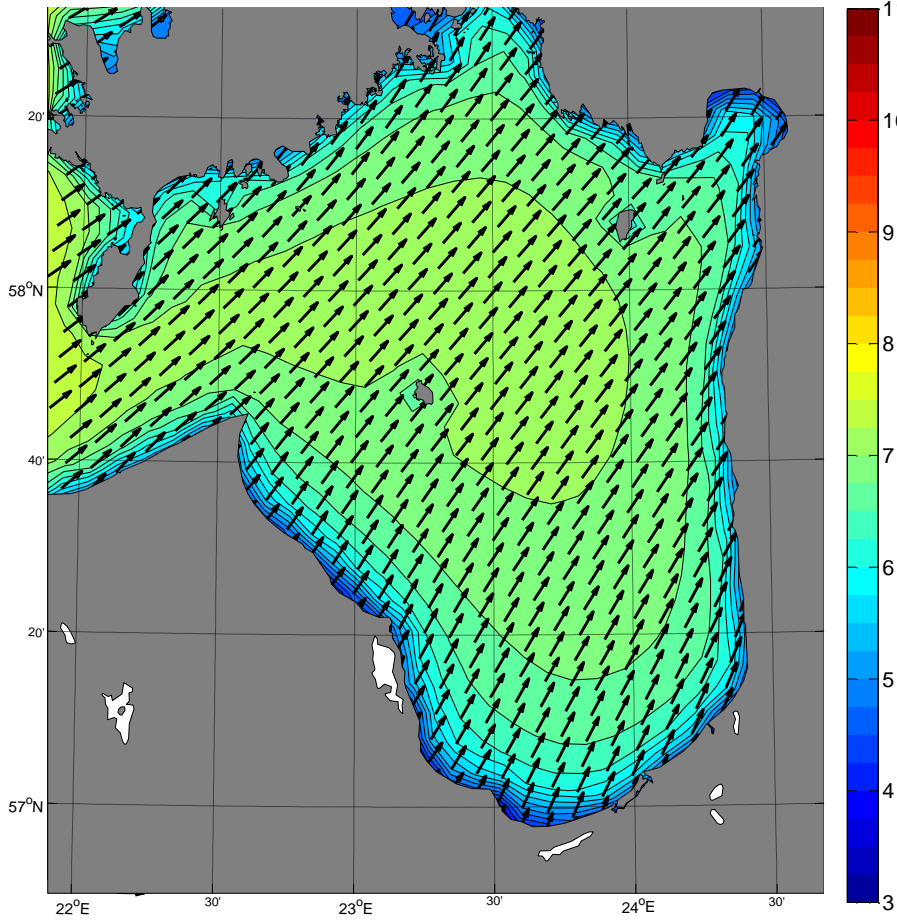
The ice conditions are summarised from the analysis of satellite imagery for Years 2001-2011.

This document contains the following information:

1. Distribution of mean annual 10 m (#4, #6) and 100 m (#5, #7) wind speed (#4-5) and energy density (#6-7) for contemporary and future climatic conditions.
2. Distribution of mean monthly 10 m (#8-9, #12-13) and 100 m (#10-11, #14-15) wind speed (#8-11) and energy density (#12-15) for contemporary climatic conditions.
3. Ice conditions for mild, medium and severe winters (#16-18).

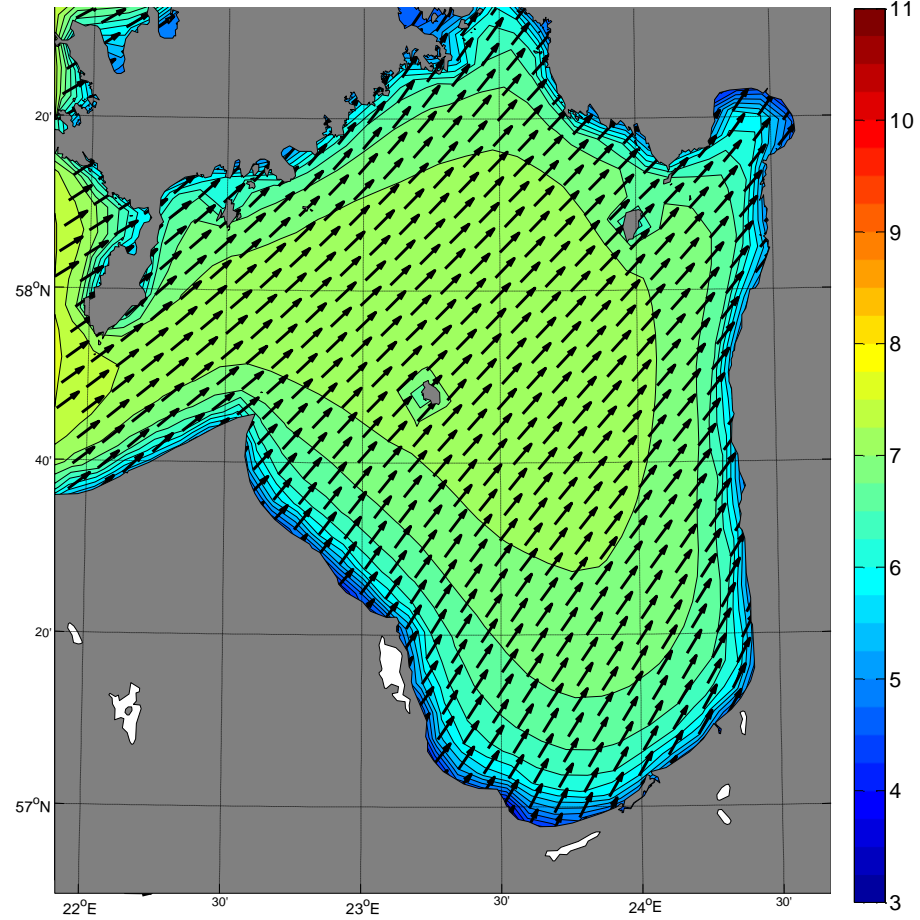
# Yearly average wind speed and wind direction at 10 m height

W 10m 1981-2010



Contemporary climate

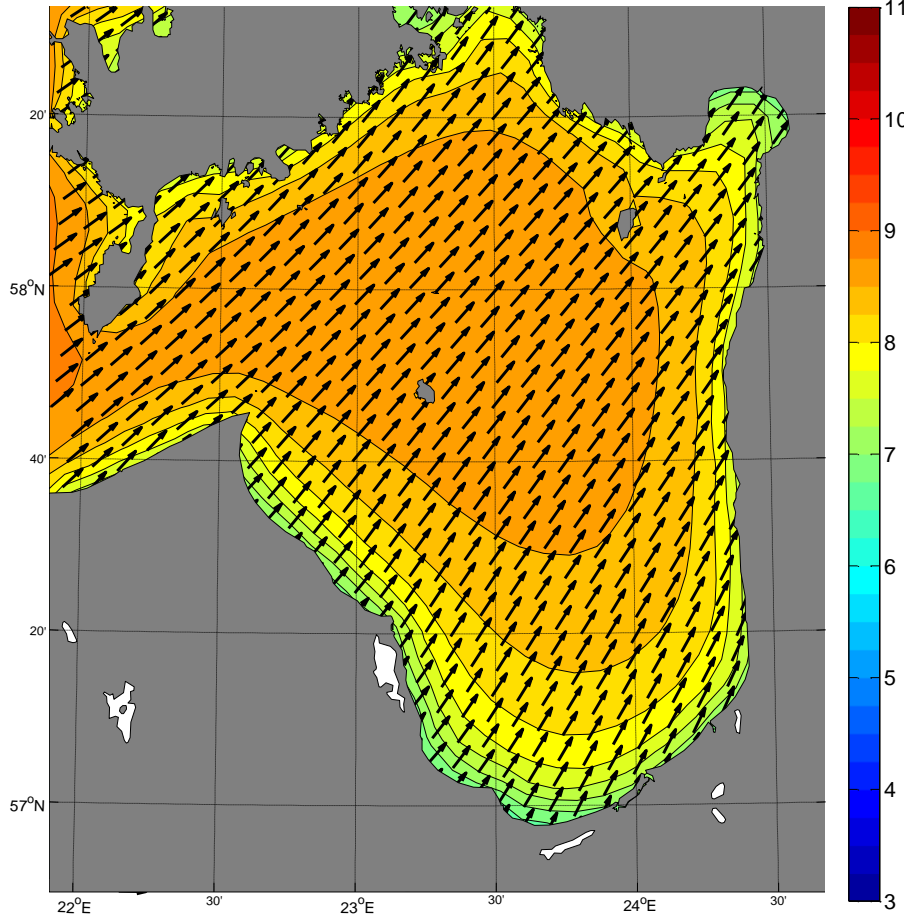
W 10m 2021-2050



Future

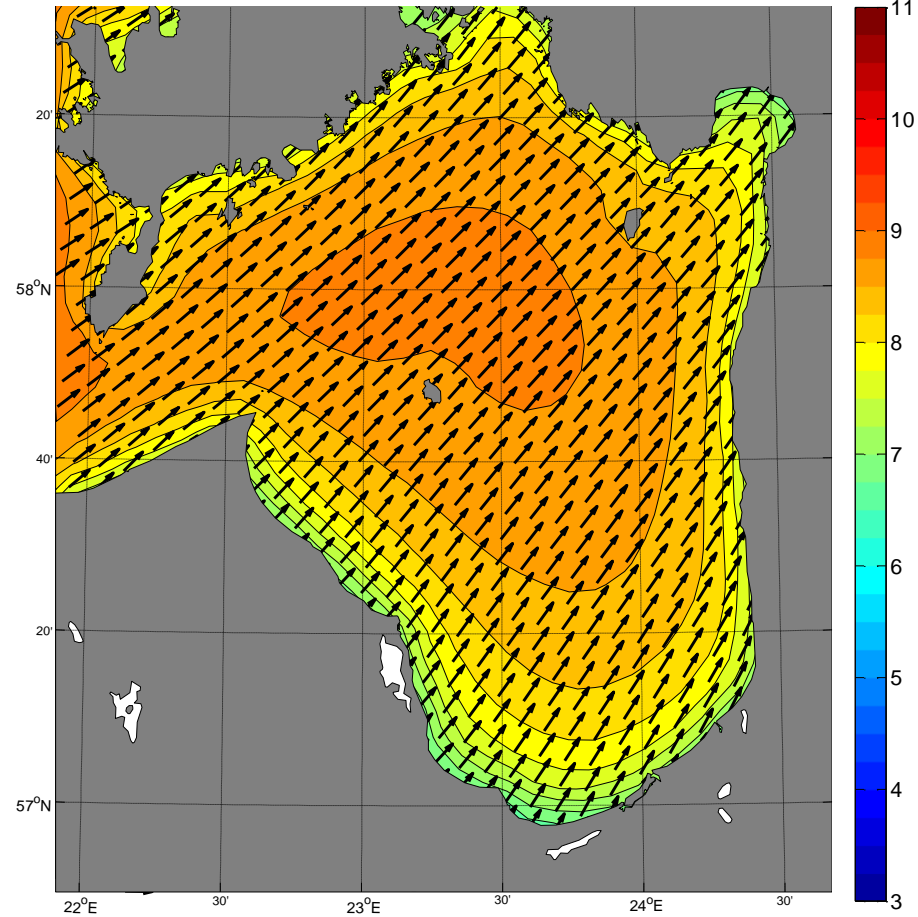
# Yearly average wind speed and wind direction at 100 m height

W 100m 1981-2010



Contemporary climate

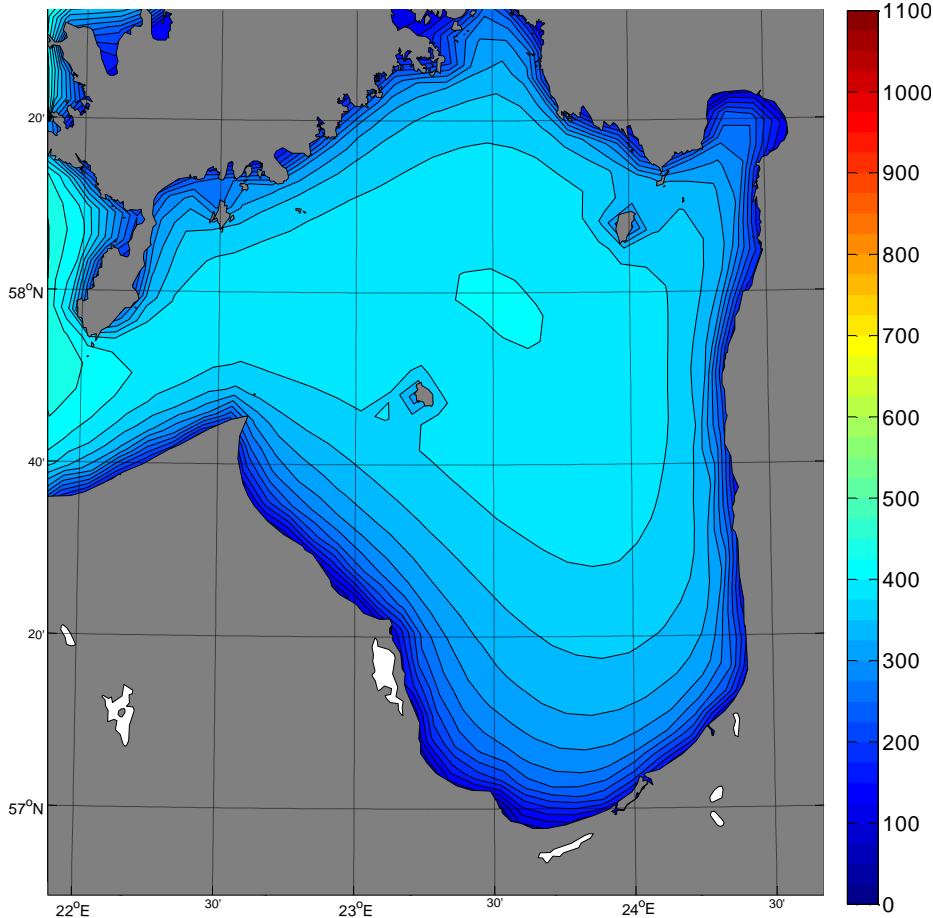
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Future

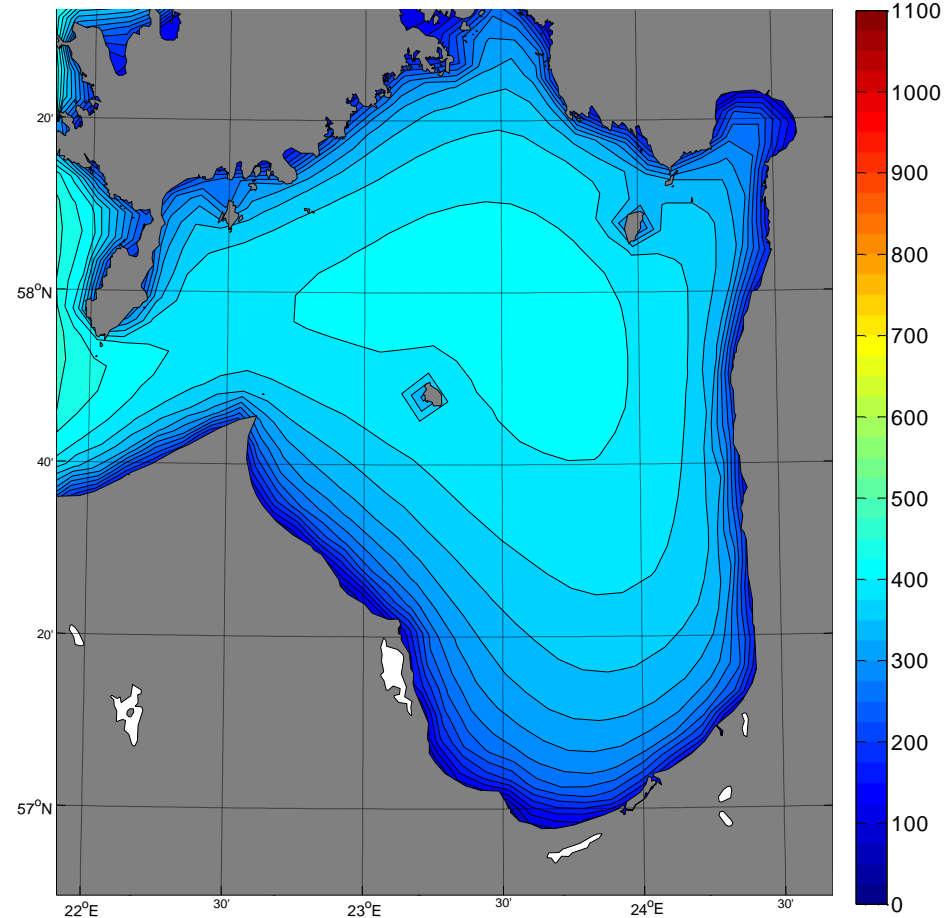
# Yearly average energy density at 10 m height

E 10 m 1981-2010



Contemporary climate

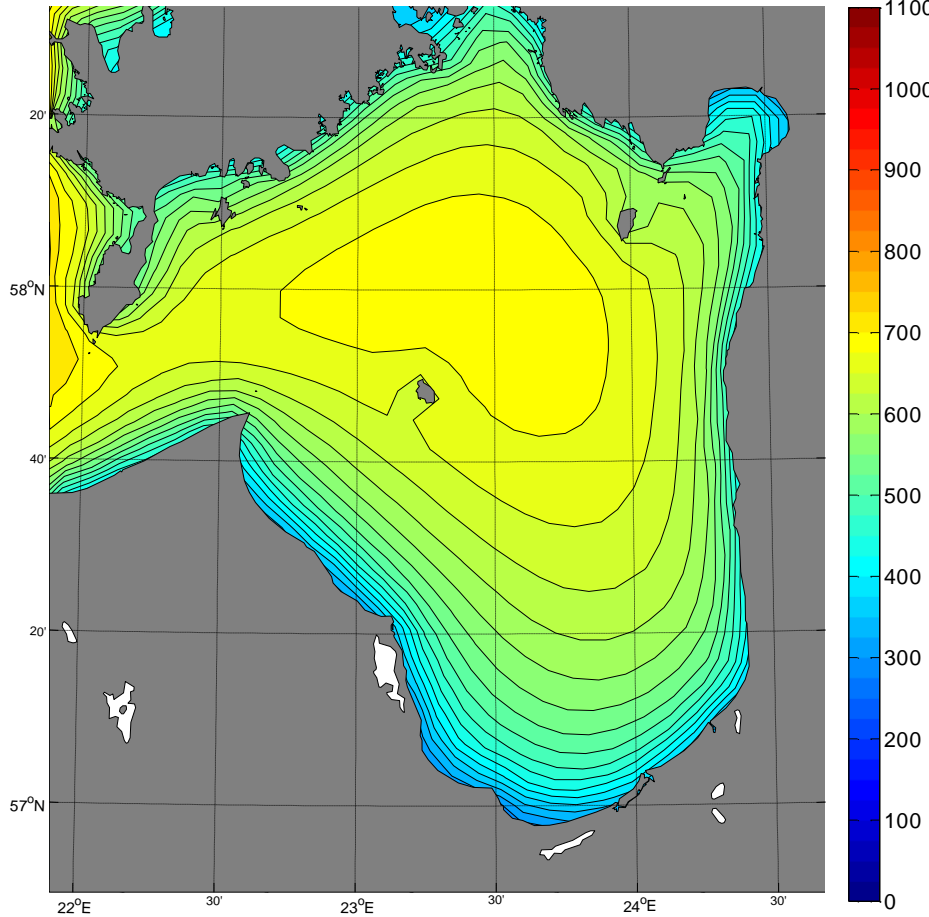
E 10 m 2021-2050



Future

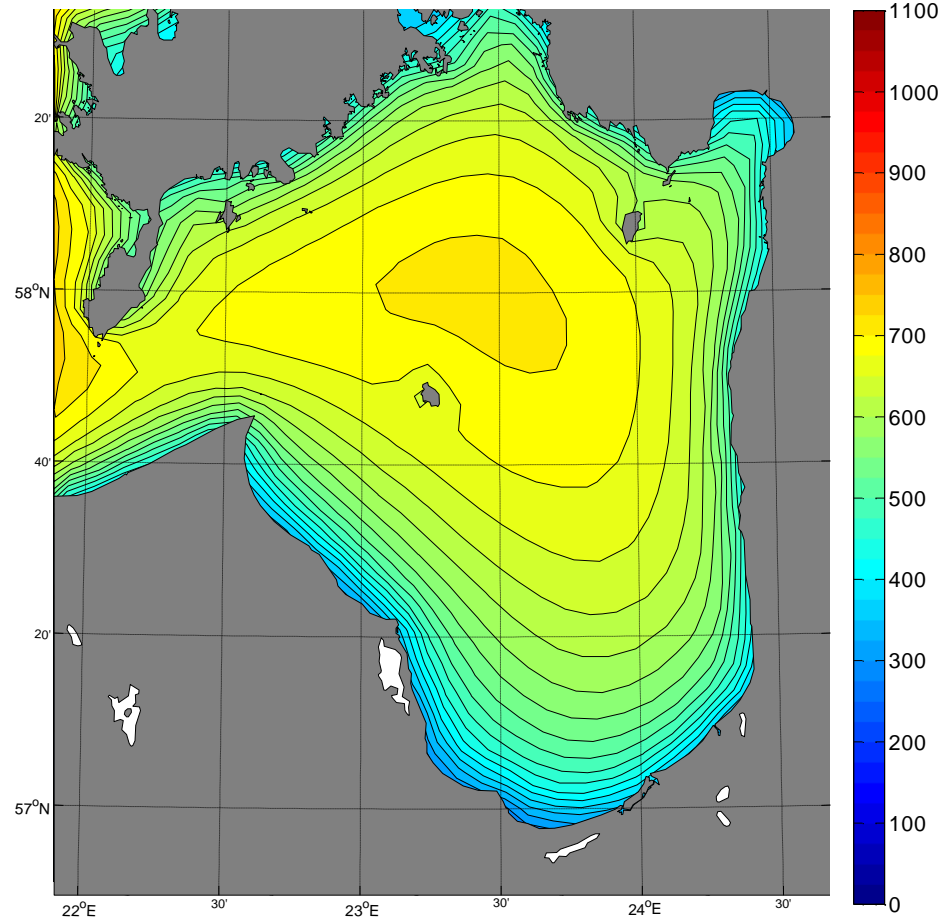
# Yearly average energy density at 100 m height

E 100 m 1981-2010



Contemporary climate

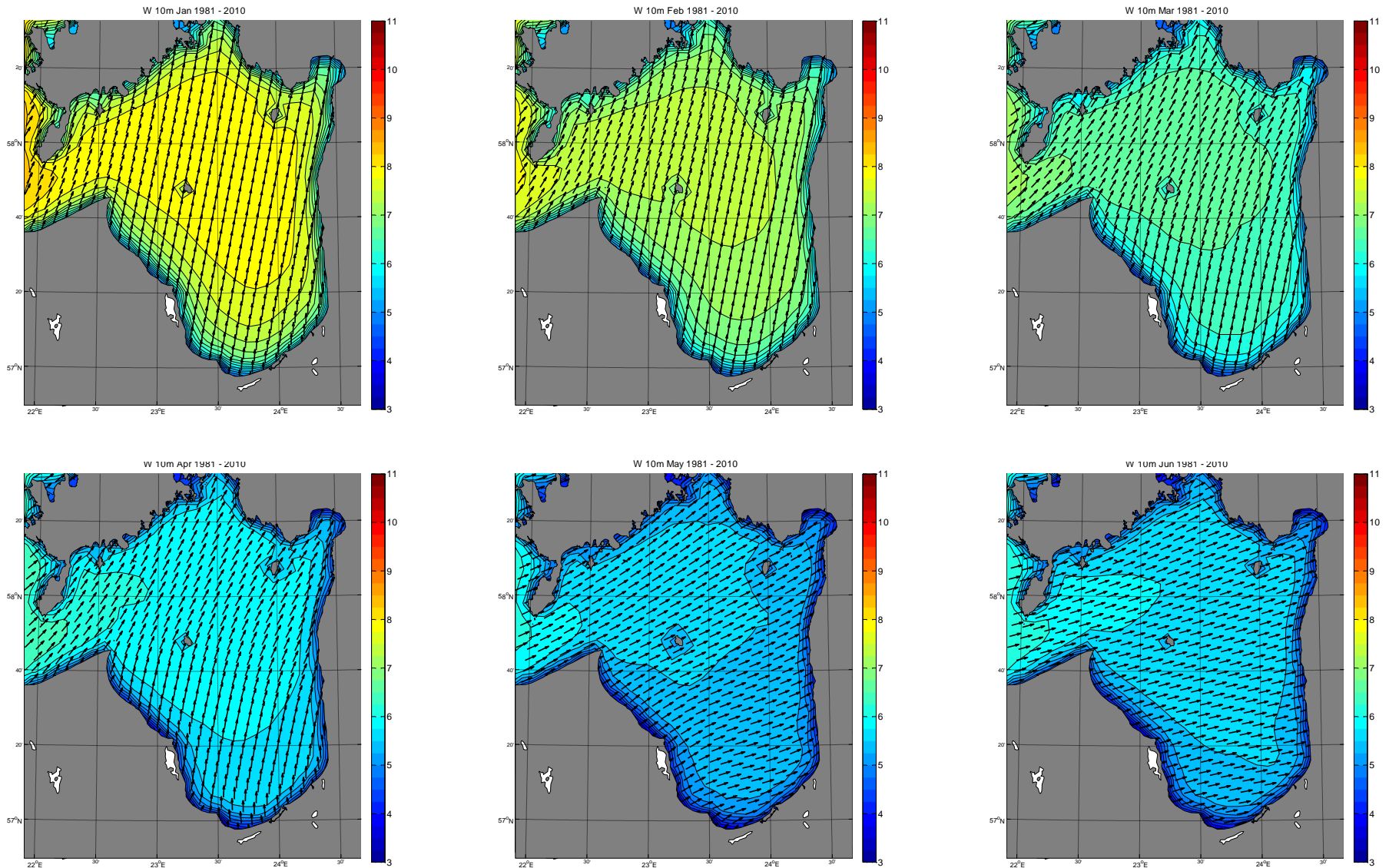
E 100 m 2021-2050



Future

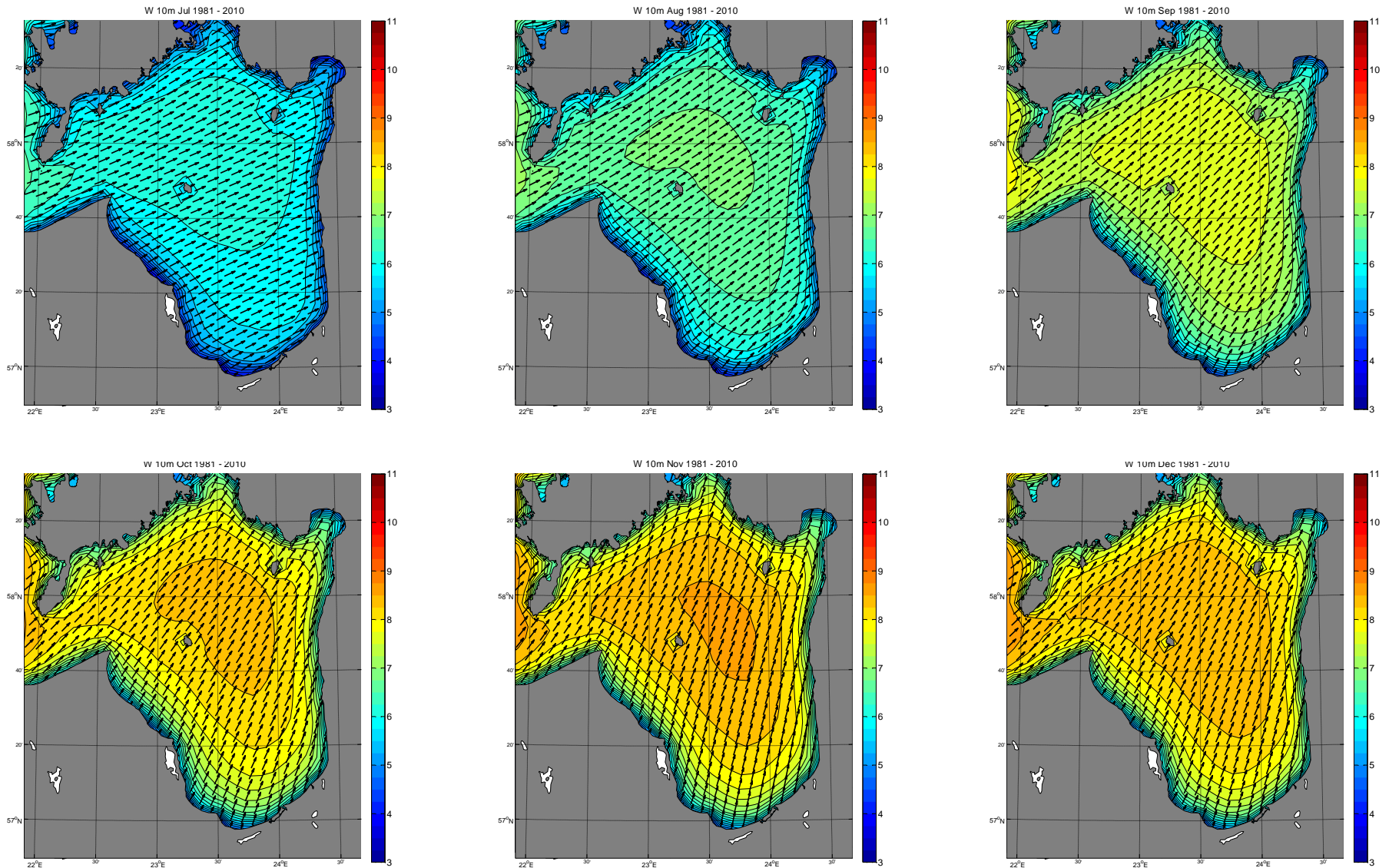


# Monthly average wind speed and wind direction at 10 m height, contemporary climate

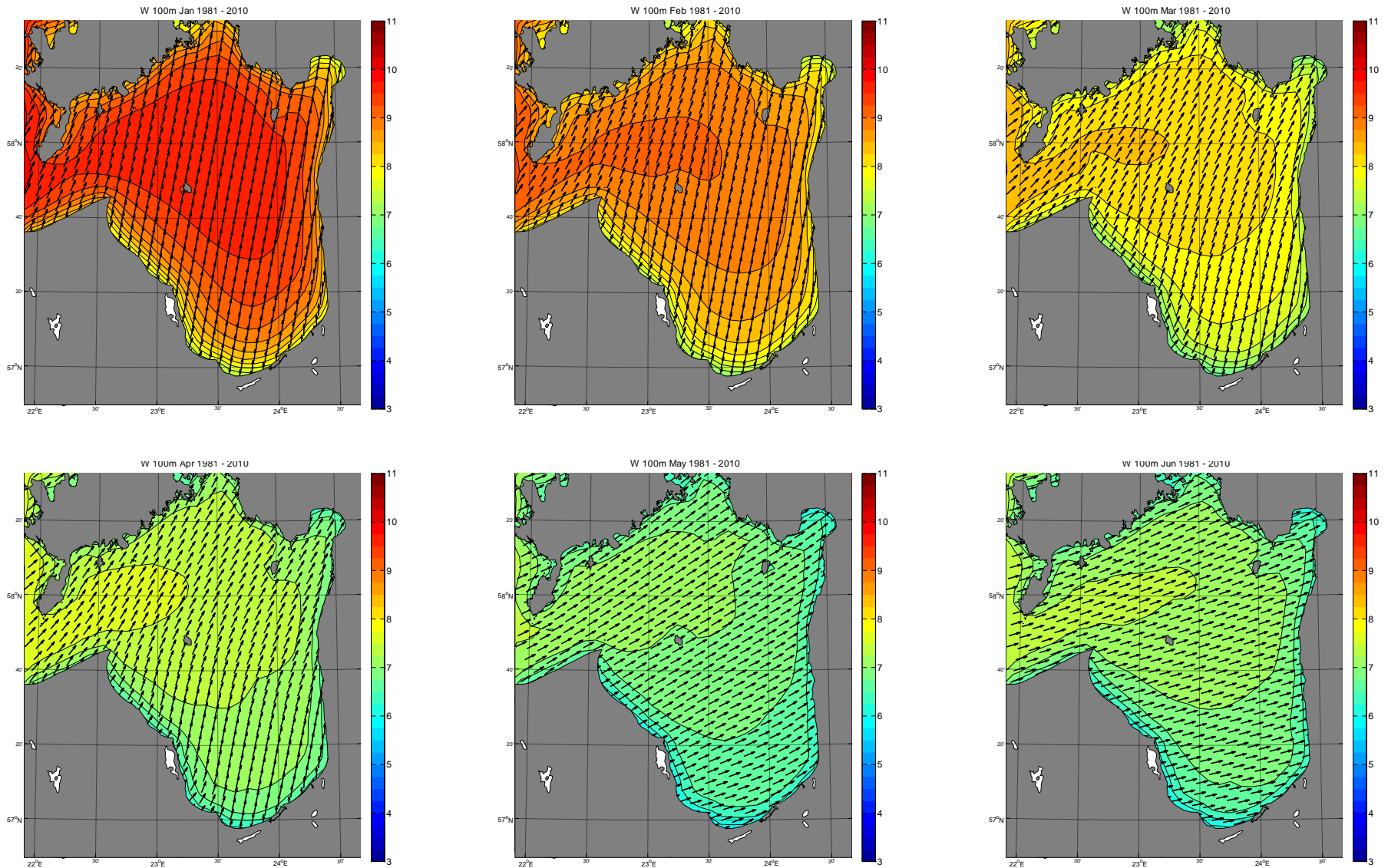




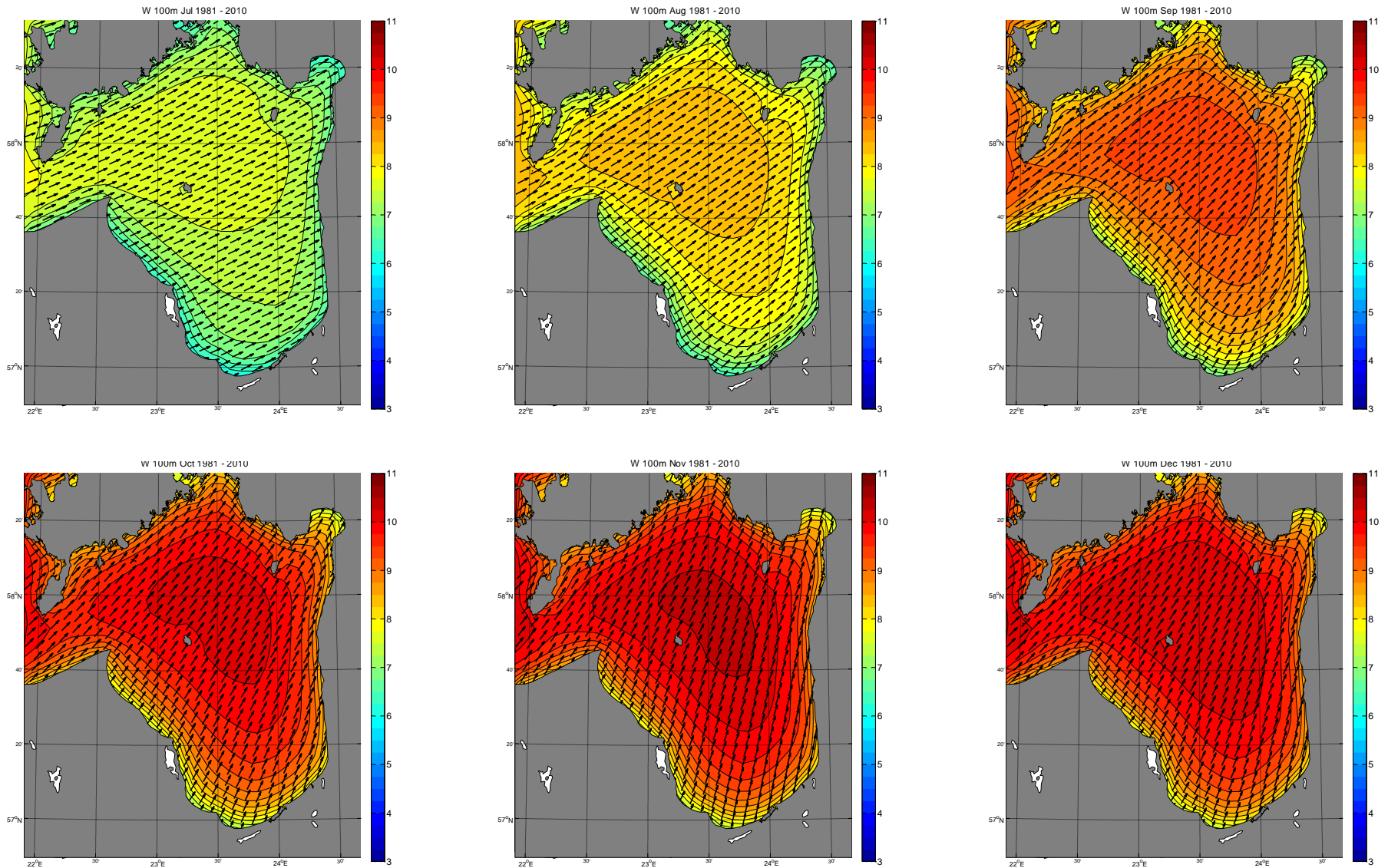
# Monthly average wind speed and wind direction at 10 m height, contemporary climate



# Monthly average wind speed and wind direction at 100 m height, contemporary climate

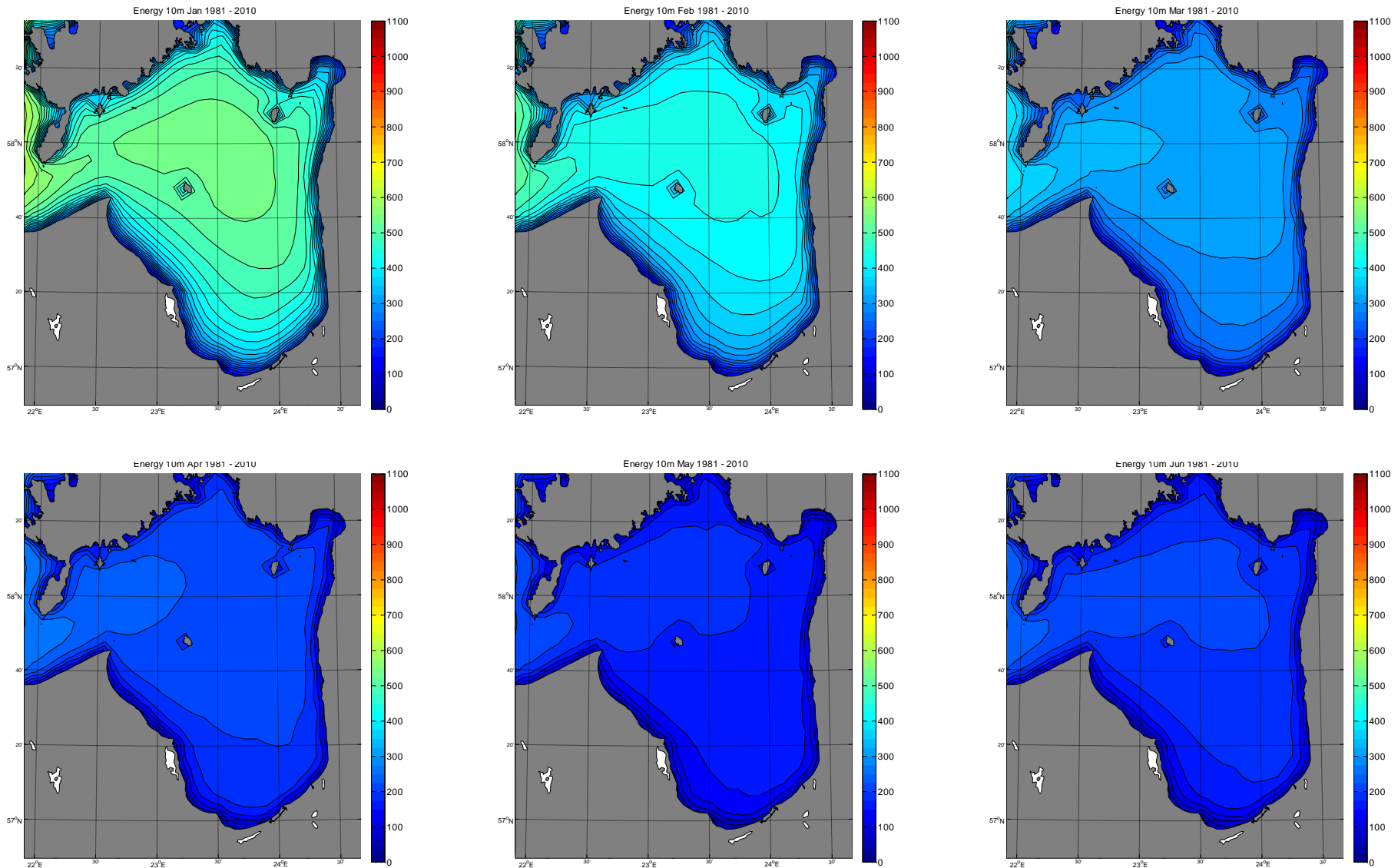


# Monthly average wind speed and wind direction at 100 m height, contemporary climate

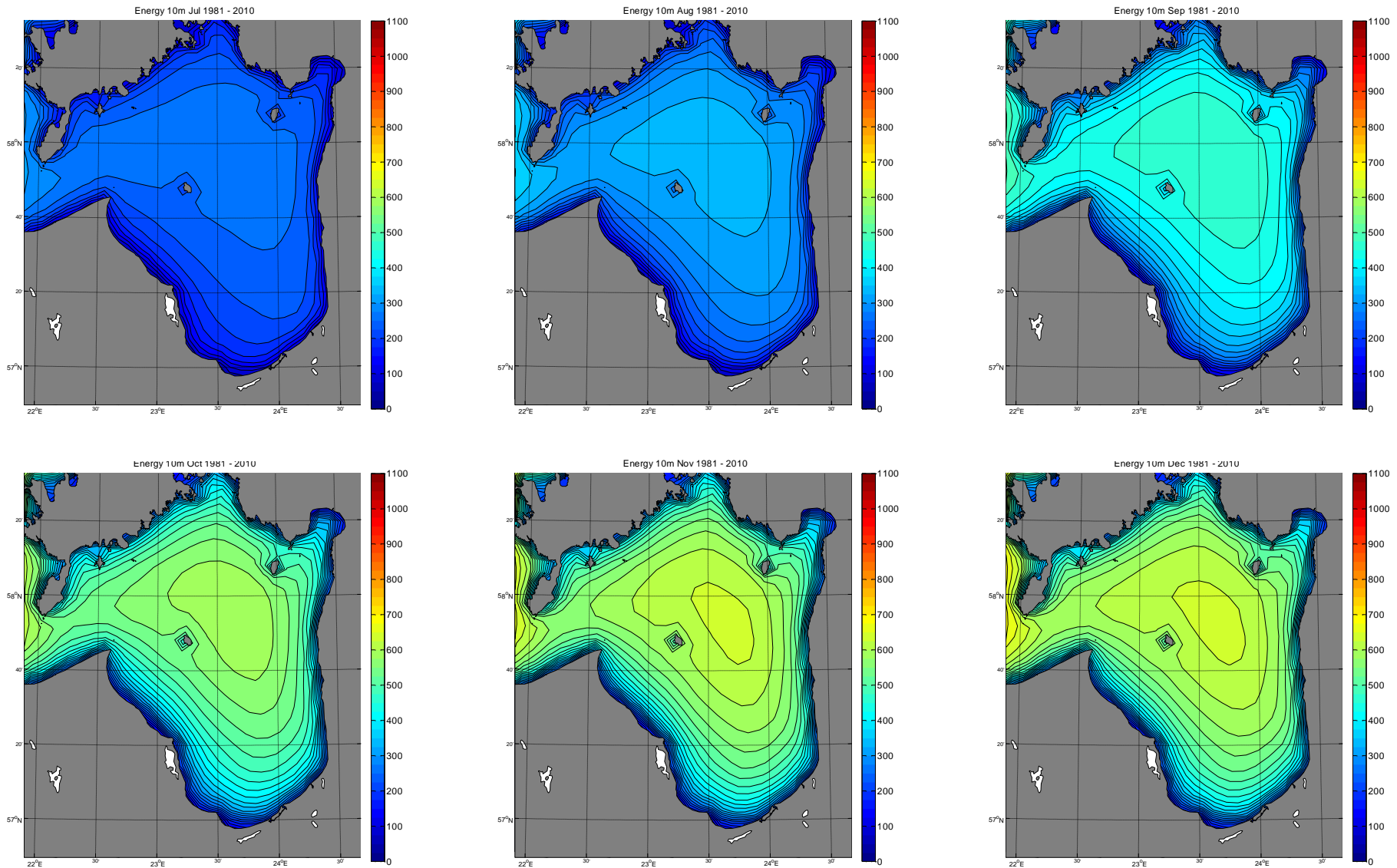




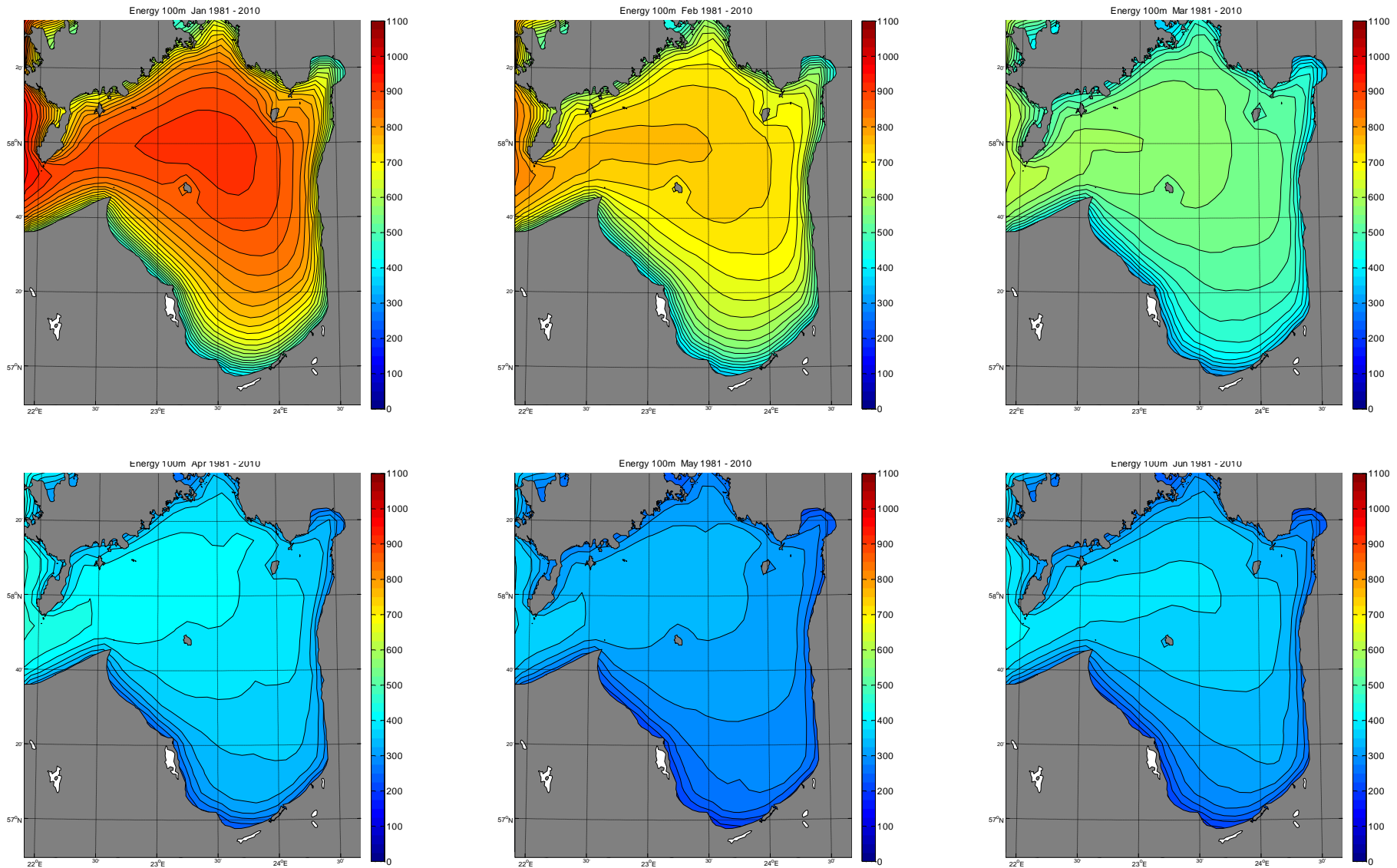
# Monthly average energy density at 10 m height, contemporary climate



# Monthly average energy density at 10 m height, contemporary climate

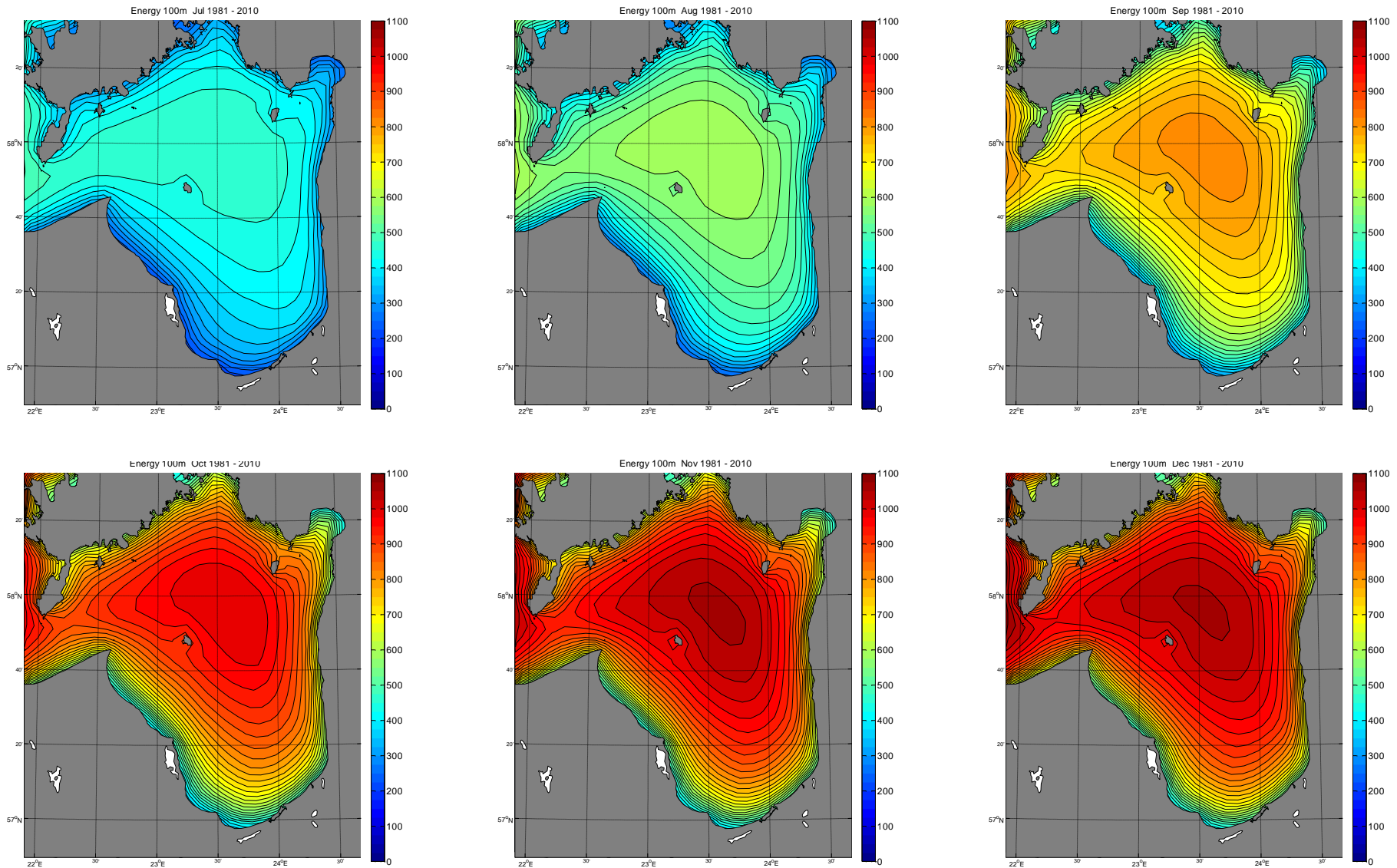


# Monthly average energy density at 100 m height, contemporary climate

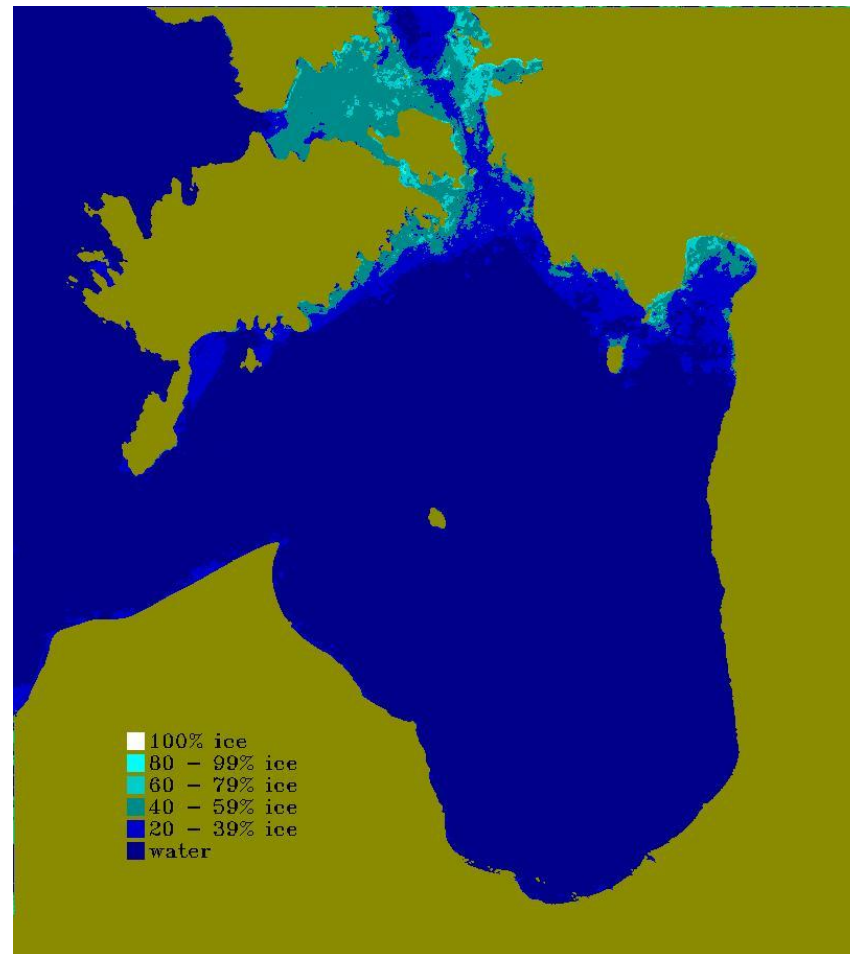




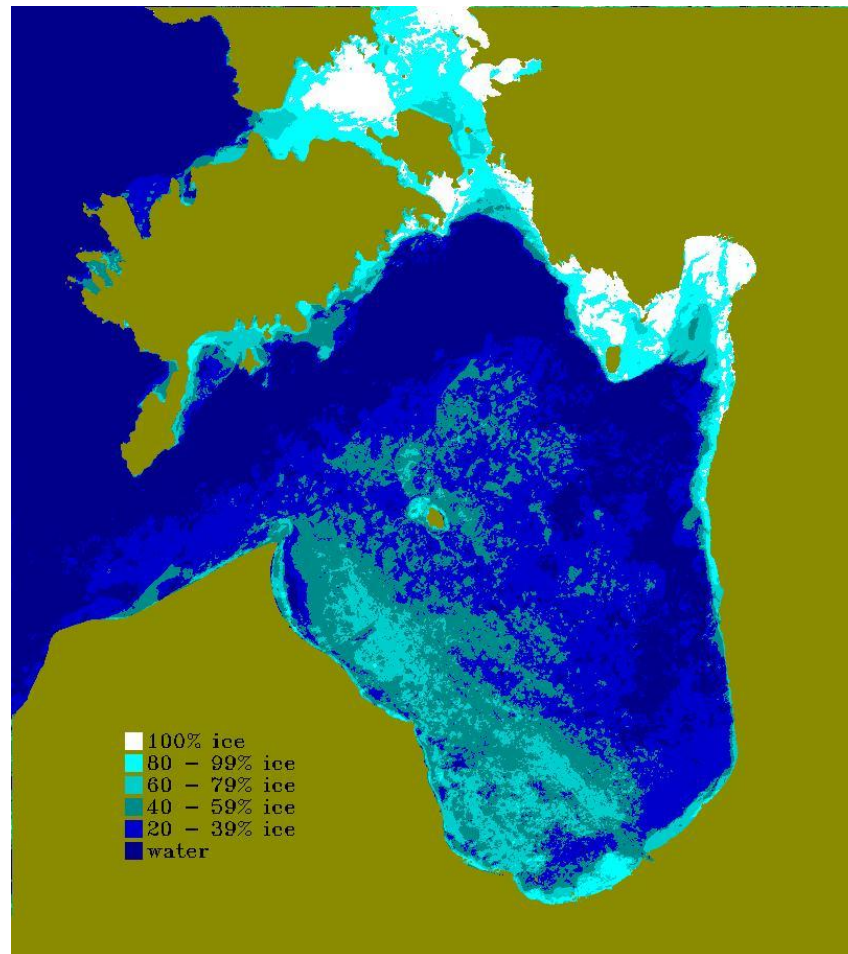
# Monthly average energy density at 100 m height, contemporary climate



# Ice conditions – mild winter



# Ice conditions – medium winter



# Ice conditions – severe winter

