EGU General Assembly 2020

Online | 4–8 May 2020

We present:

- A new coastal climatology dataset based on a 30 years hindcast
- Long-term tendencies based on the analysis of Weather Circulation Types
- Short-term impact of heavy storms along the North-Western Mediterranean coasts

Coastal climatology of the North-Western Mediterranean area for long-term and short-term risk assessment

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Atmospheric/wave modelling chain → from global to coastal scales

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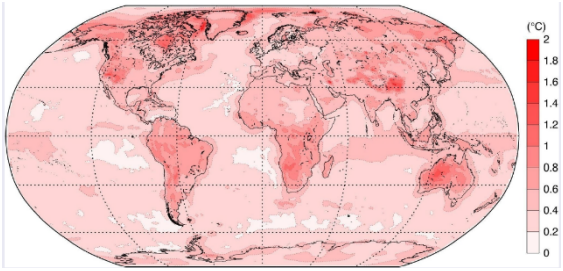
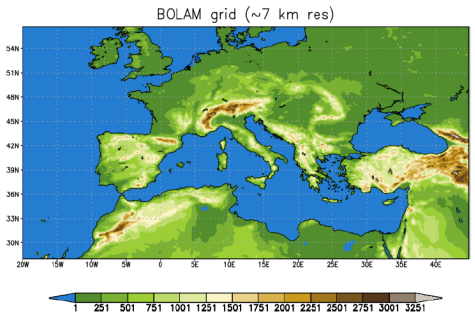
30 years hindcast 1990-2019



ERA5: ECMWF atmospheric reanalysis of the global climate

Hydro-static BOLAM model, 7 km grid



Nested non-hydrostatic MOLOCH model, 2.5 km grid

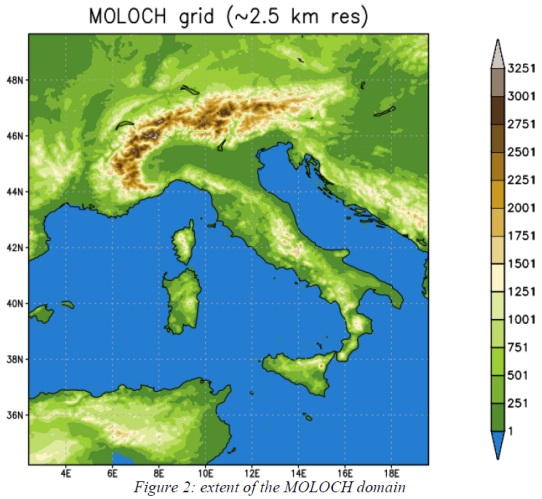
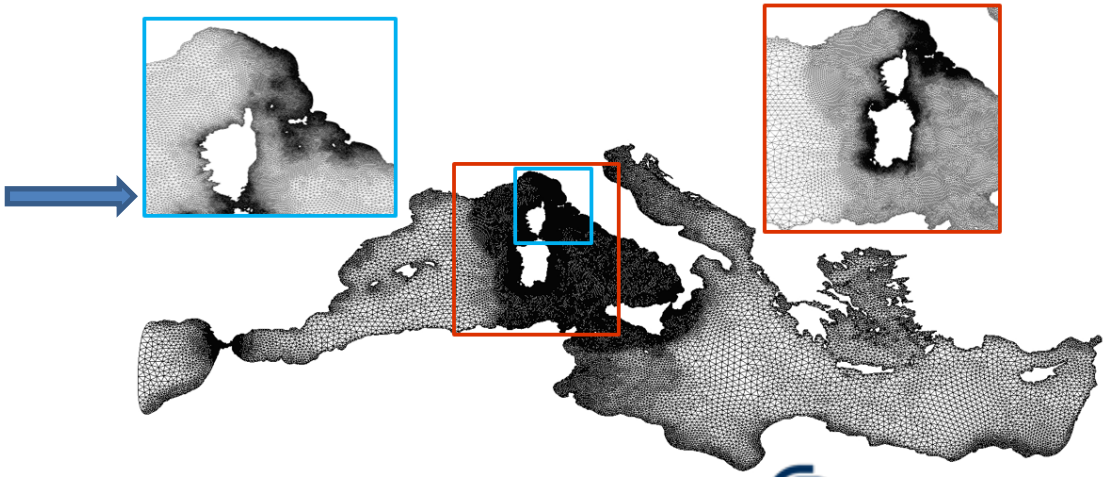


Figure 2: extent of the MOLOCH domain

Unstructured grid WW3 wave model with higher coastal resolution up to 0.5 km resolution along the North-Western Mediterranean coast



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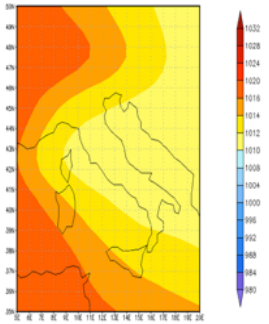
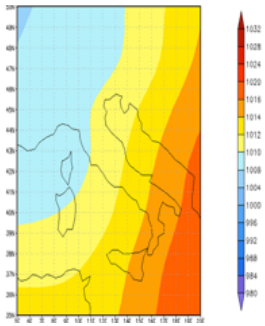
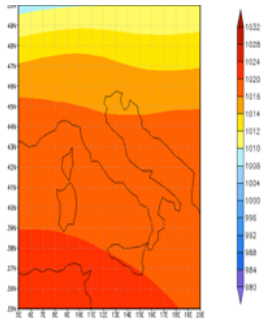
Analysis of Weather Circulation Types: 9 types, analysis on MSLP (PCT09 – MSLP)



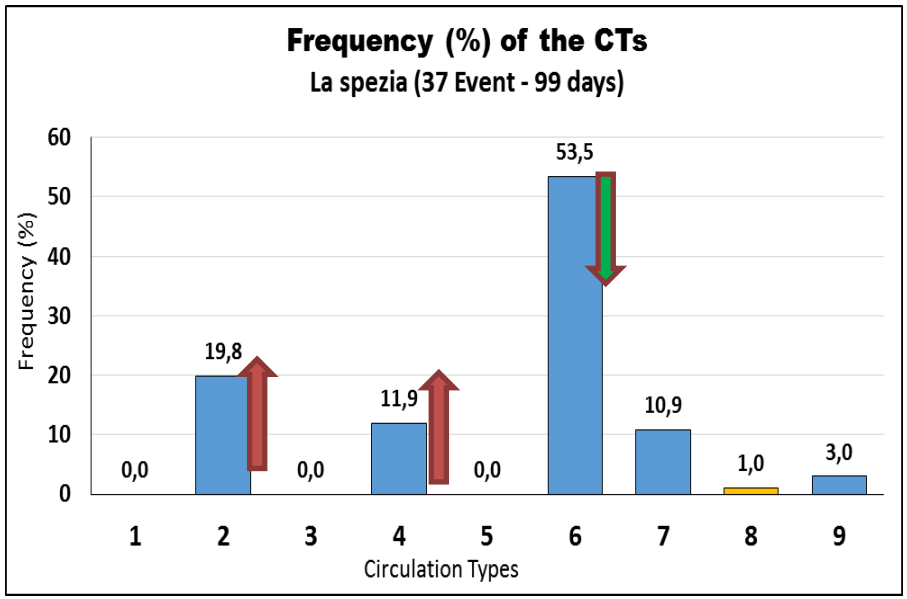
CT2 - High pressure North of Alps, low over central Italy moving southward. Northerly wind over Northern Italy, cyclonic wind circulation over central-southern part of the country.



CT4 - Atlantic trough associated with deep low pressure over gulf of Lion/Ligurian Sea. High pressure blocking over Balkans. Warm and moist southerly flow over central-northern Italy with very unsettled weather conditions.



CT6 - High pressure over northern Africa and zonal flow over central Europe with steep pressure gradient. Westerly winds prevailing over central-northern Italy.



CT4, cyclonic, often associated to intense storms with heavy rains, is less frequent, but it shows a tendency to significantly increase. The same for CT2

CT6 (zonal circulation) is more frequent, but it tends to decrease in the last decade

Long-term risk assessment

An example of CT6: the storm of 28-30 October 2018

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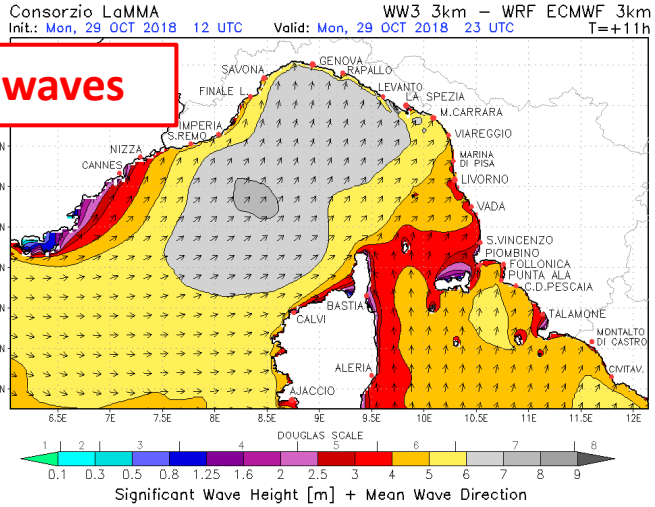
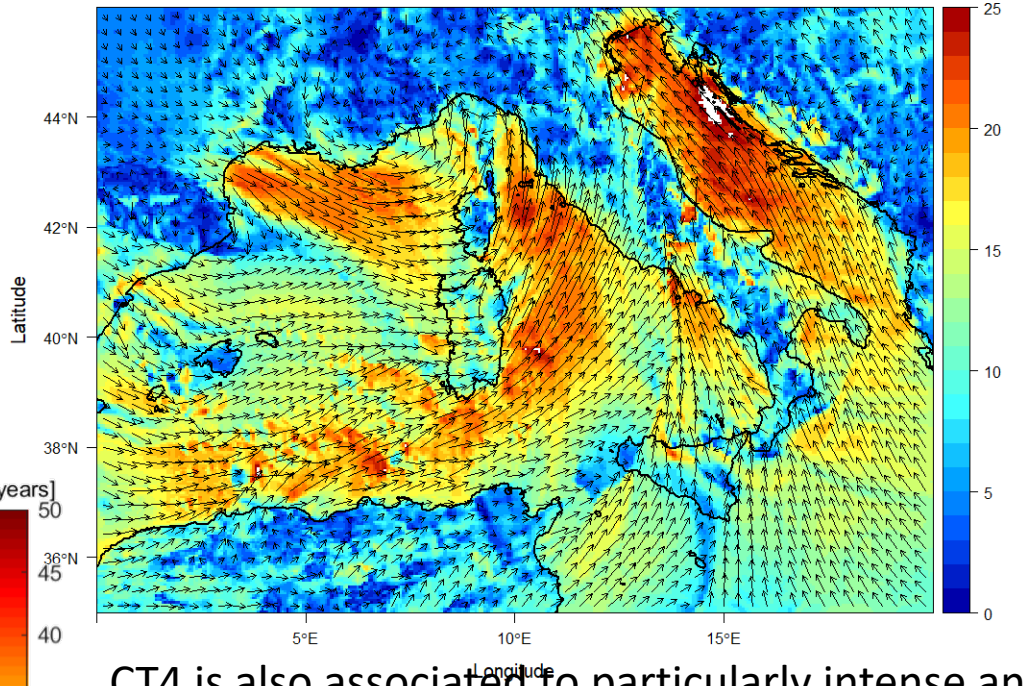
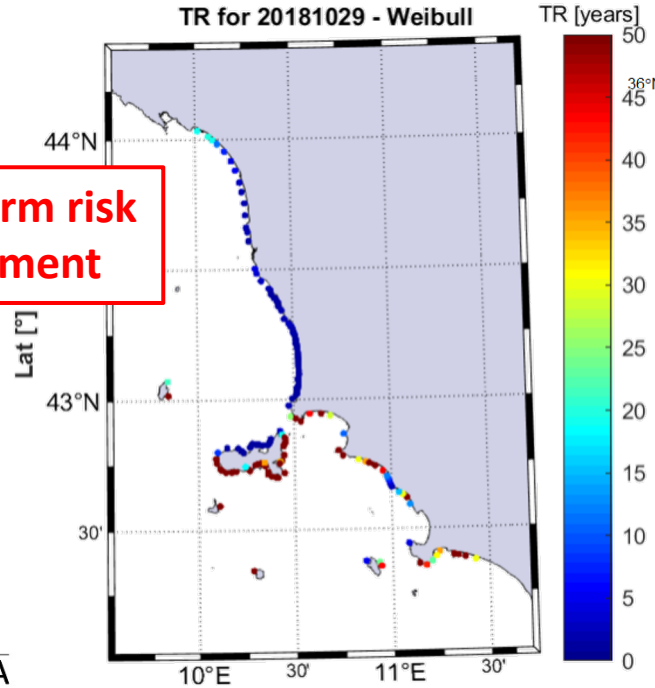
waves



winds



Short-term risk assessment



CT4 is also associated to particularly intense and damaging storms (such as the one of October 28-30th 2018 with Return Time > 50 years for Ligurian and southern Tuscany coast). The tendency of this Circulation Type is to increase, and we found in the recent past different cases with similar synoptic configuration, and similar impact on the coast (for example 6 Nov 2000)

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