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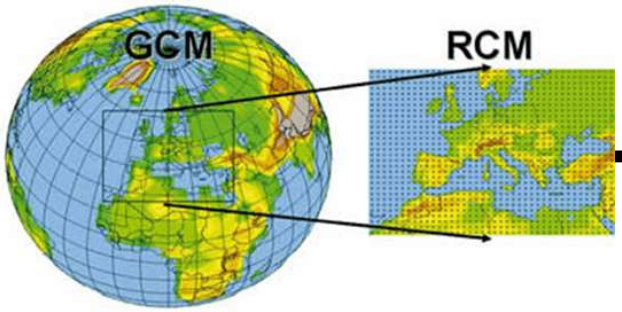
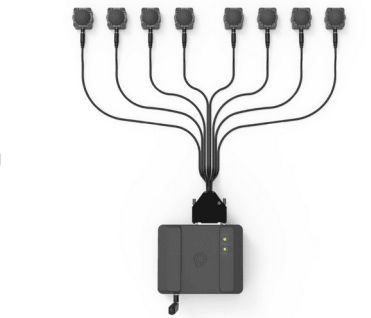
High-Resolution Projections of Wind Energy Potential for Sustainable Planning in the Eastern Mediterranean

Assaf Hochman

Fredy and Nadine Herrmann Institute of Earth Sciences





Acoustic Sensing

1. Motivation

- The extreme summer heat in the Middle East poses significant societal challenges, but winds help mitigate heat stress.
- Understanding and predicting Middle Eastern summer winds are critical not only for mitigating heat stress but also for advancing wind energy.

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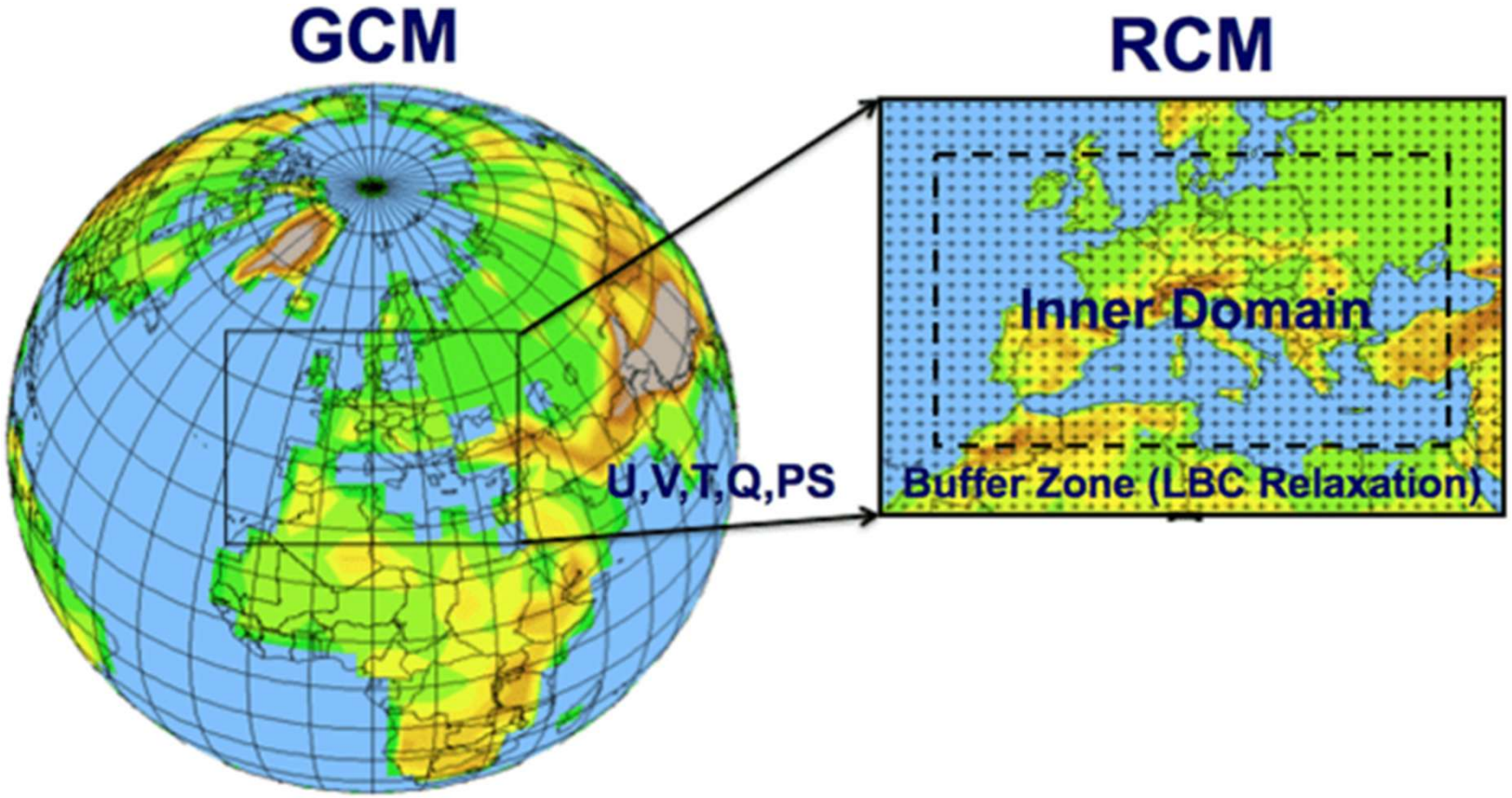
1. Dynamical downscaling



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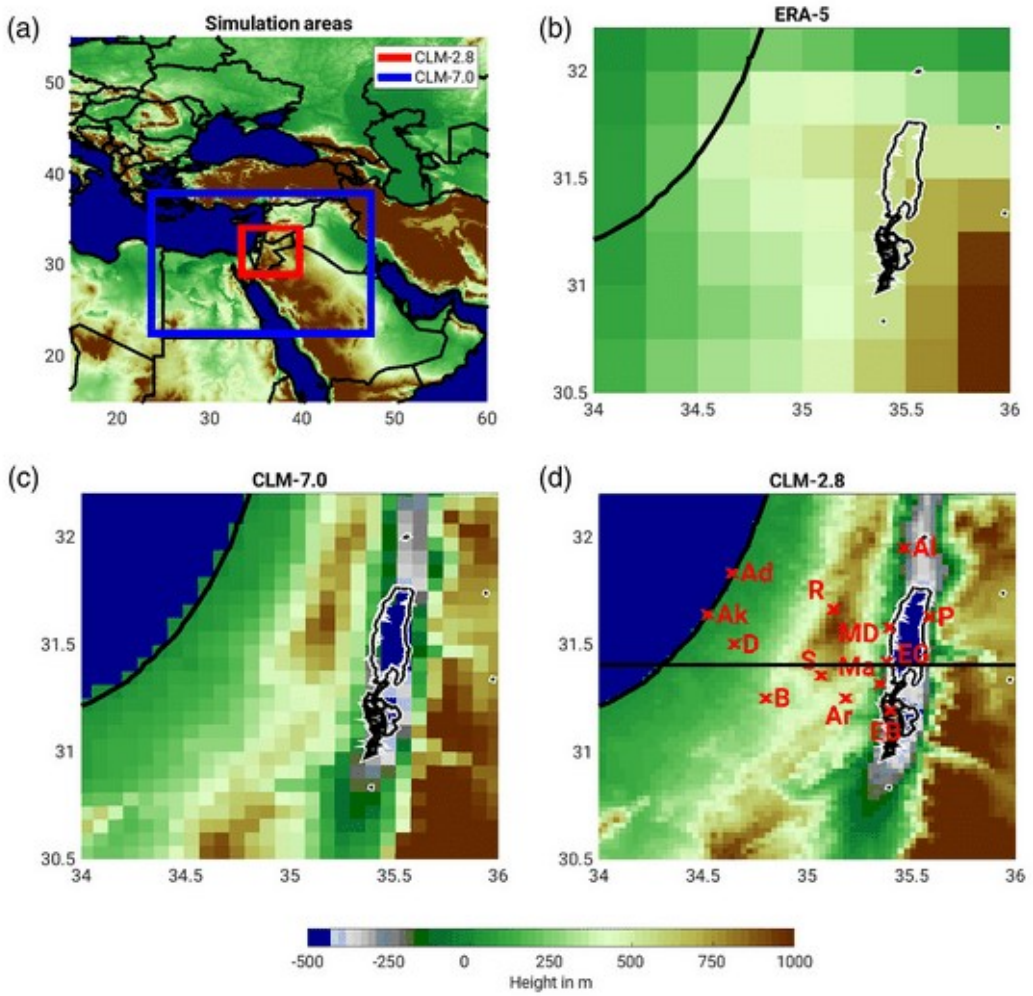
1. Convection-permitting simulations



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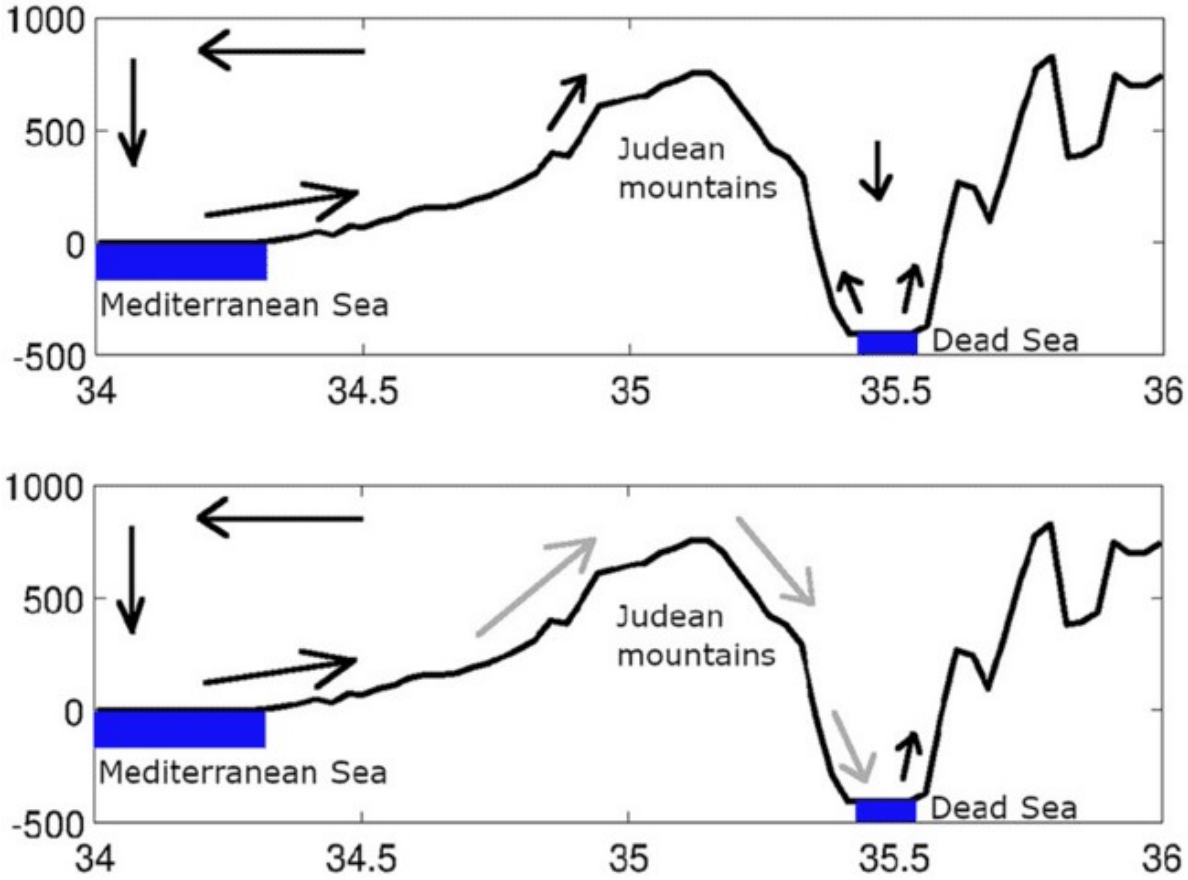
1. Complex topography and interacting wind systems



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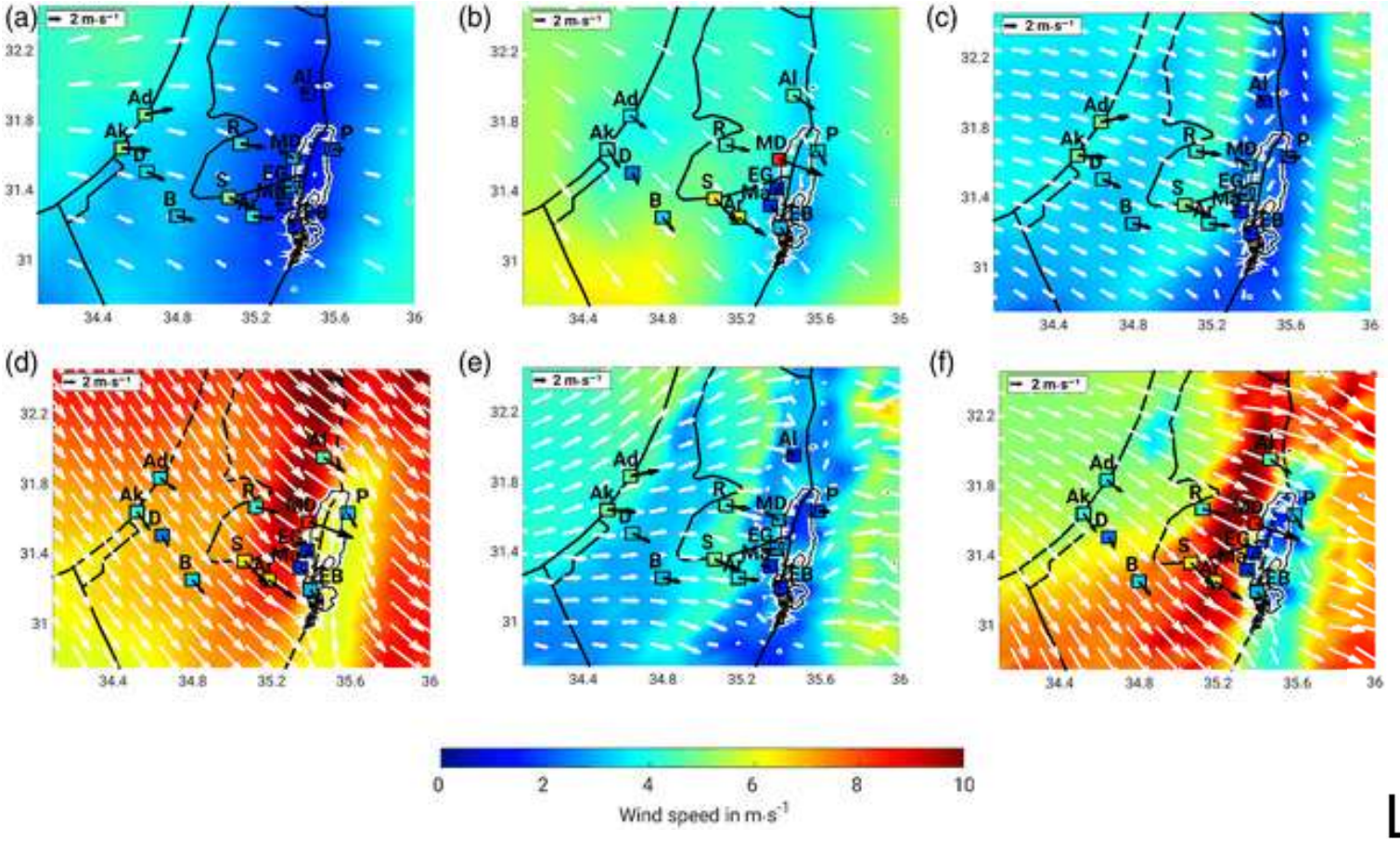
1. Model evaluation



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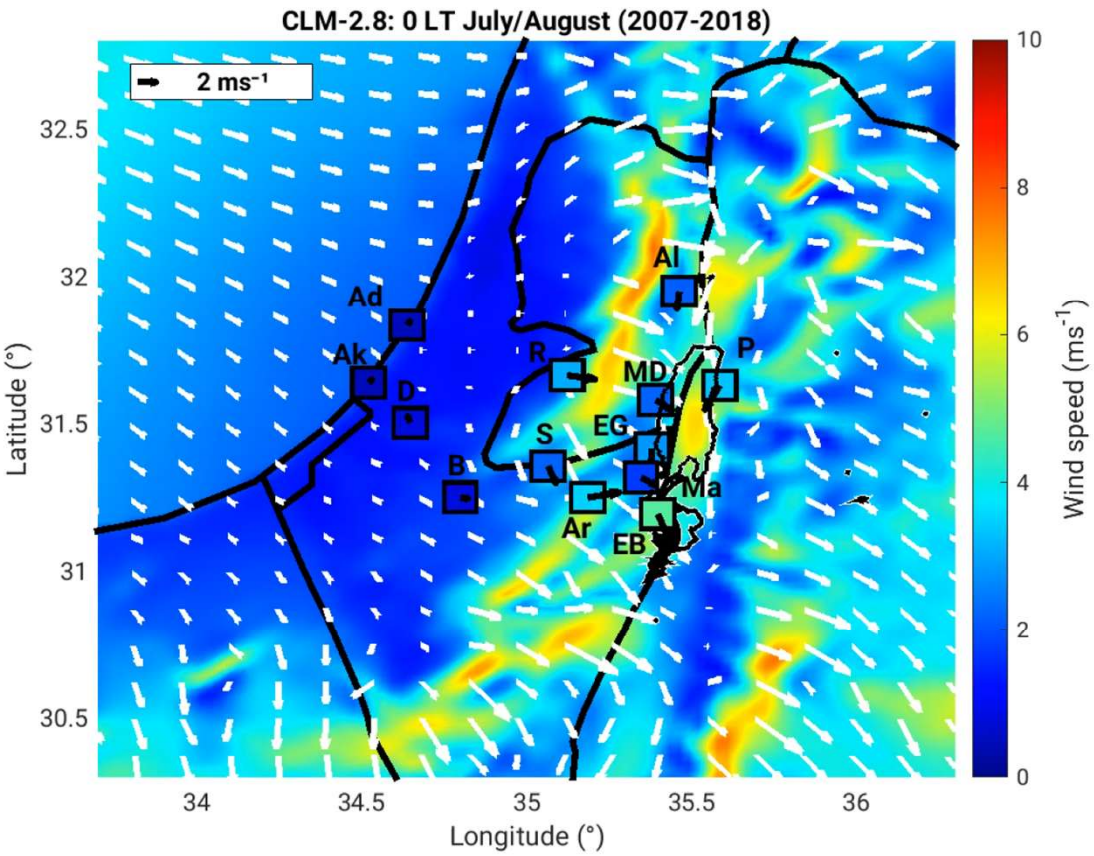

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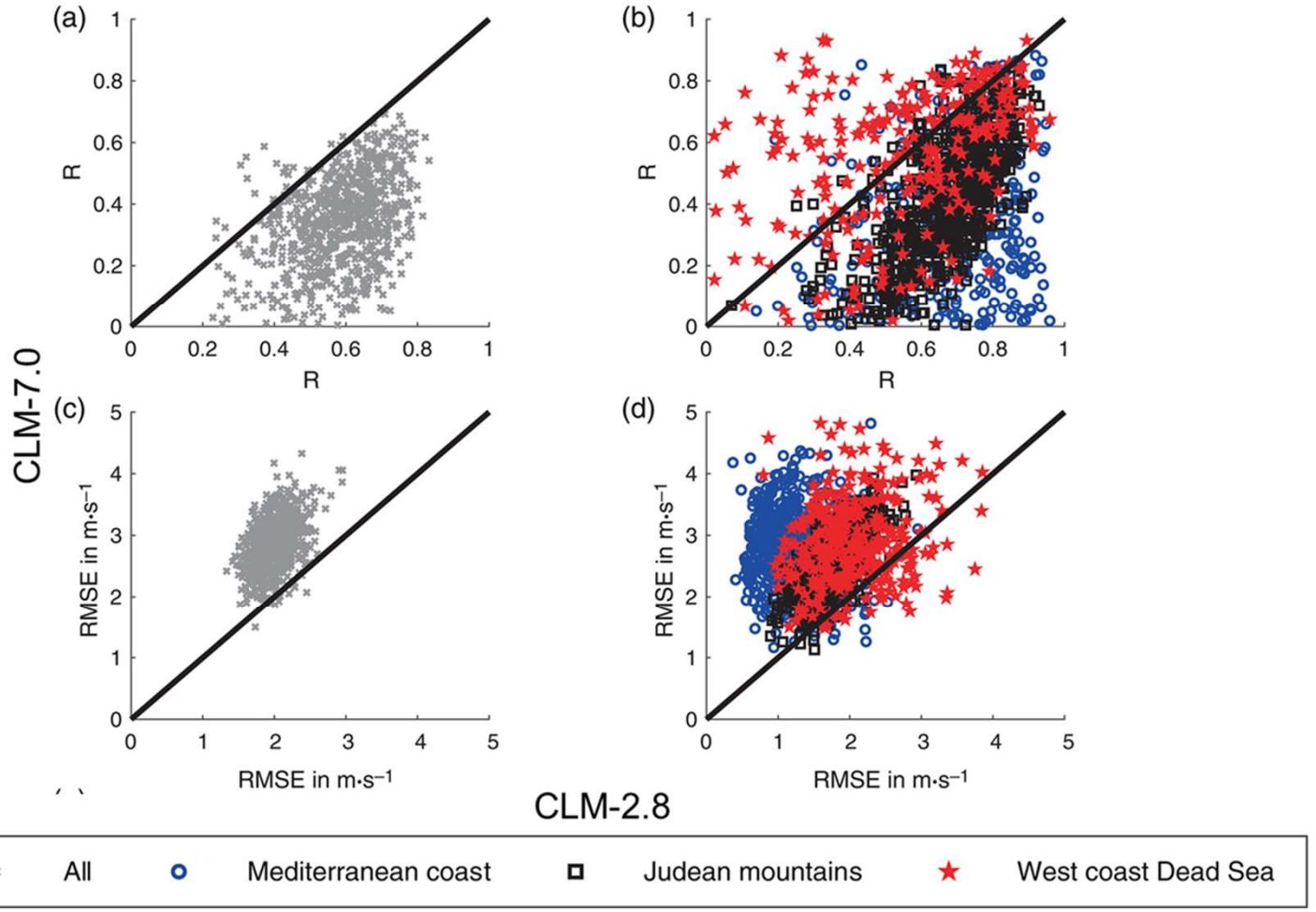

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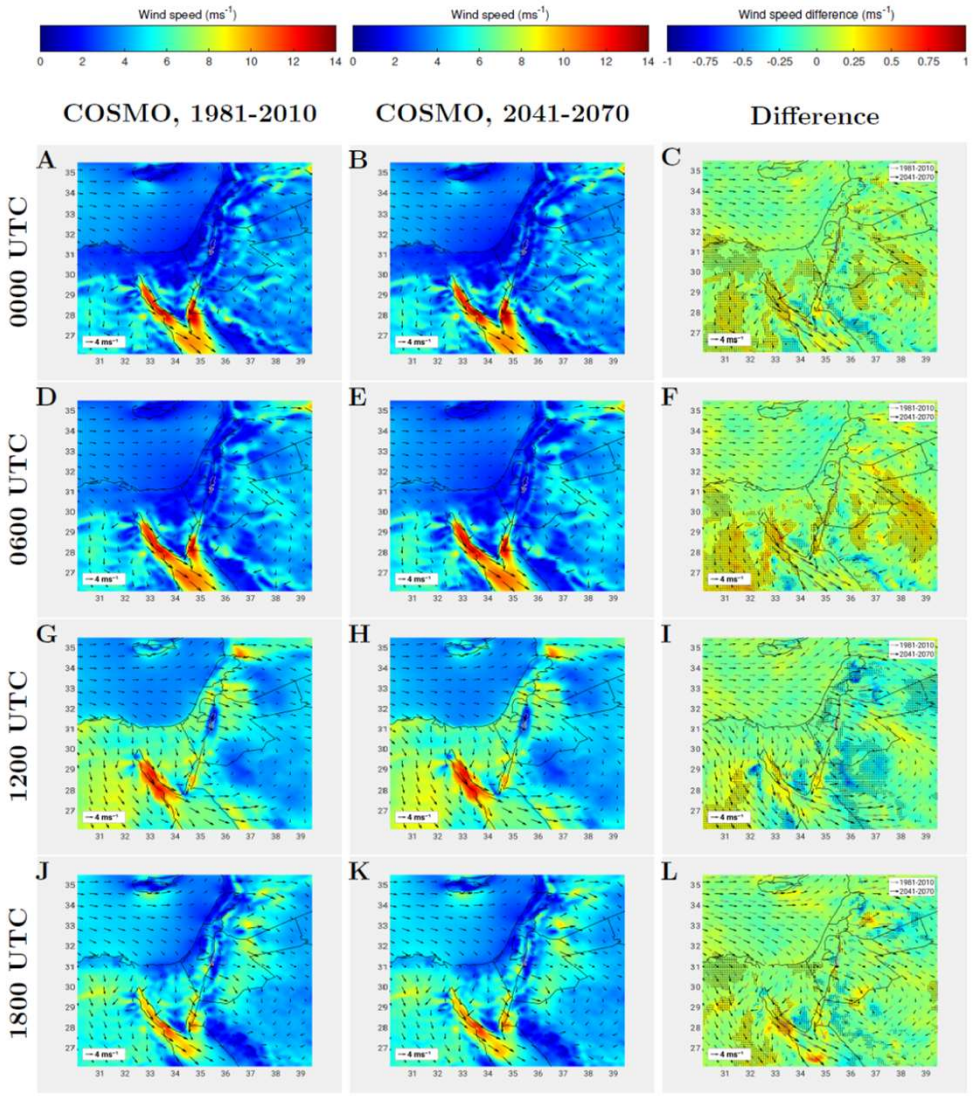
1. Projected near surface winds



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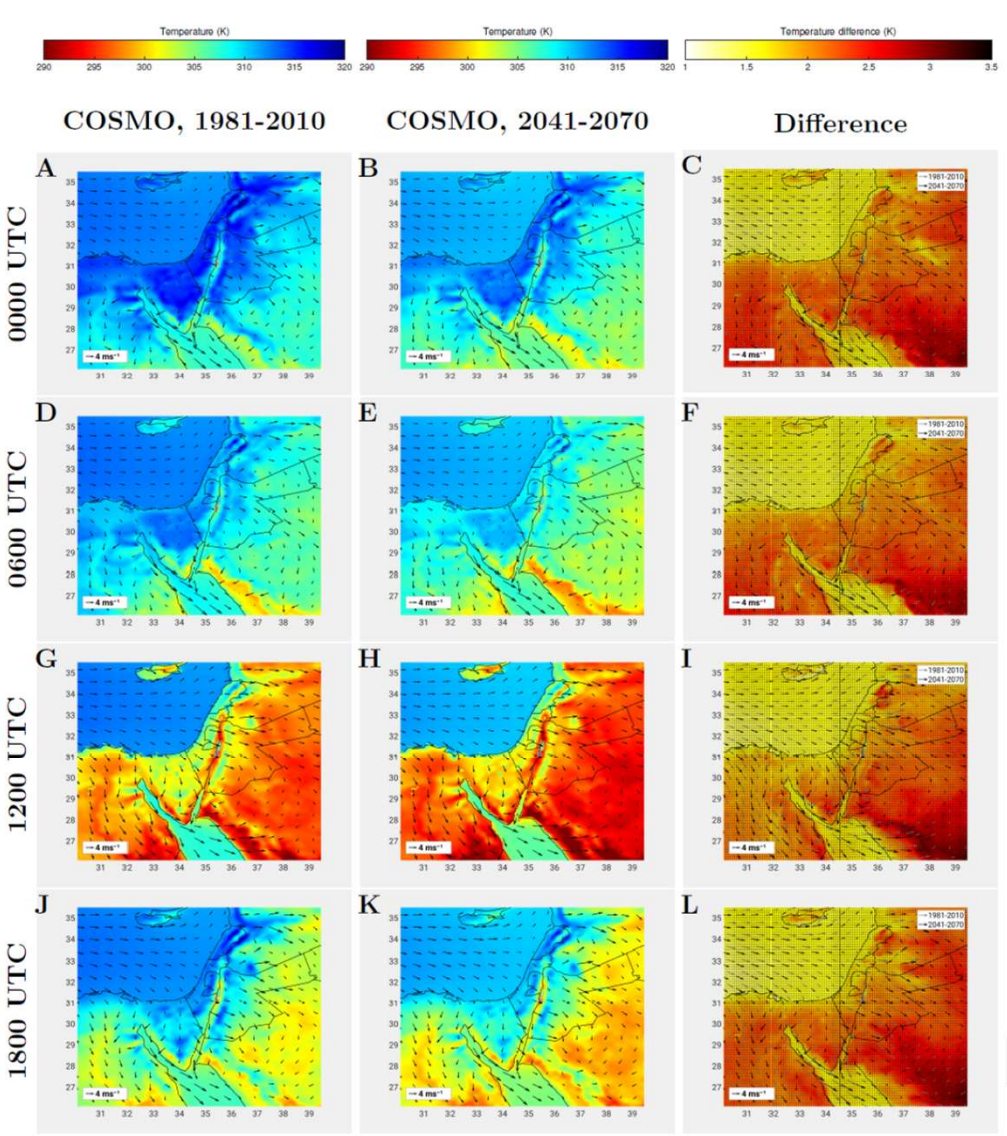
1. Projected near surface temperature



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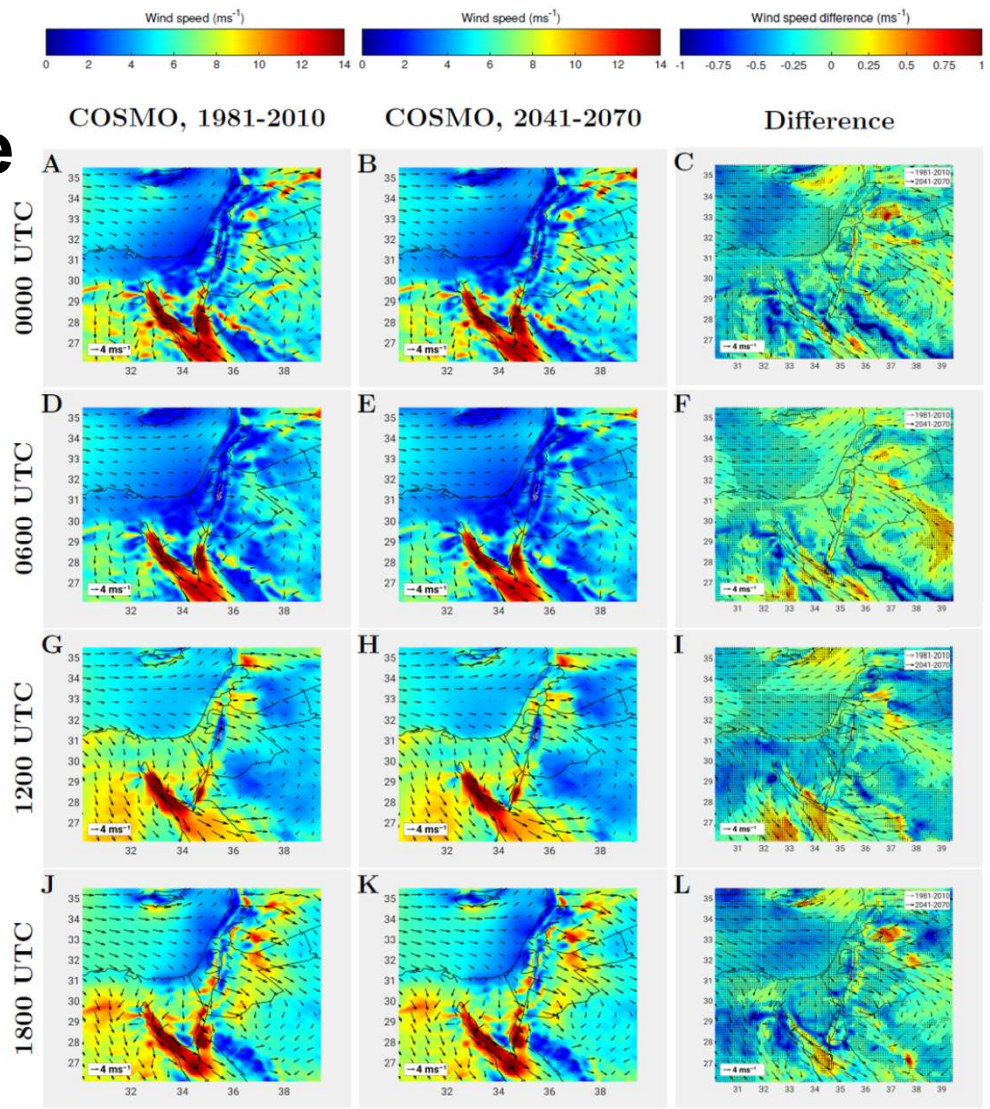
1. Projected wind speed at the turbine height (150m).



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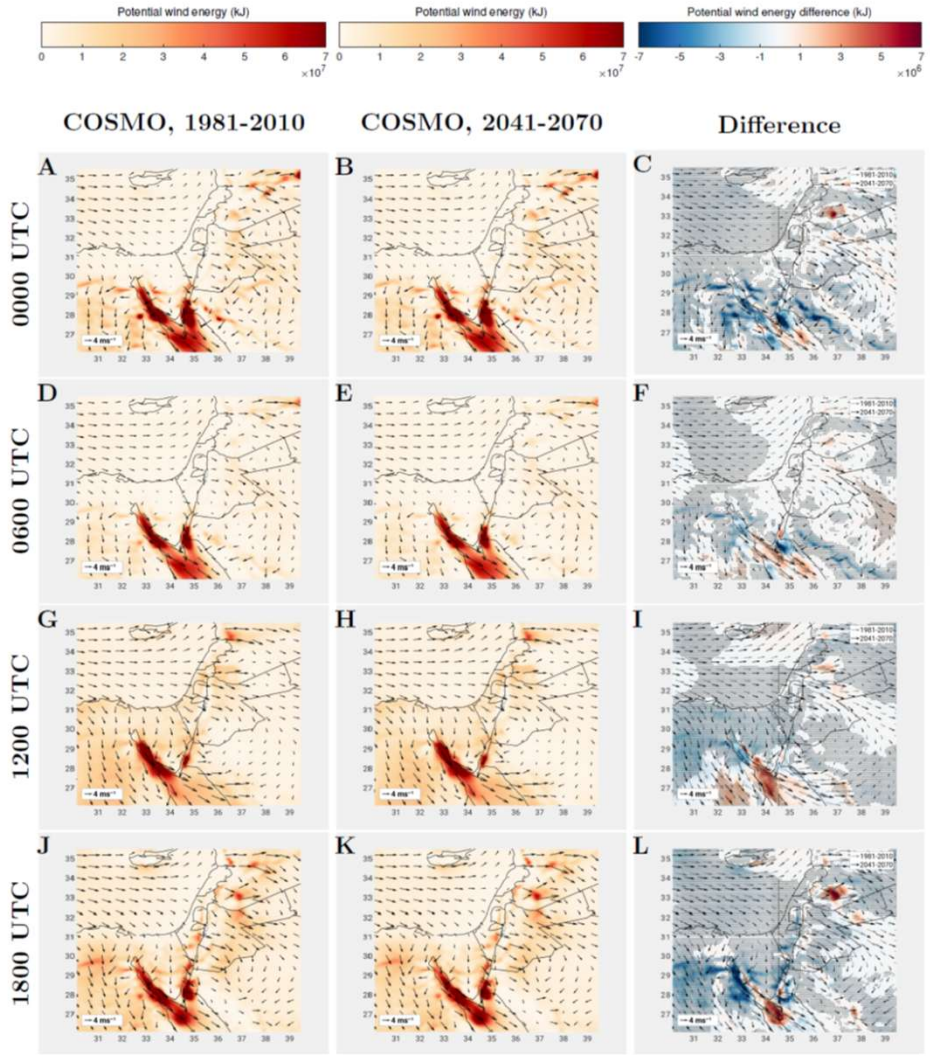
1. Projected wind power potential



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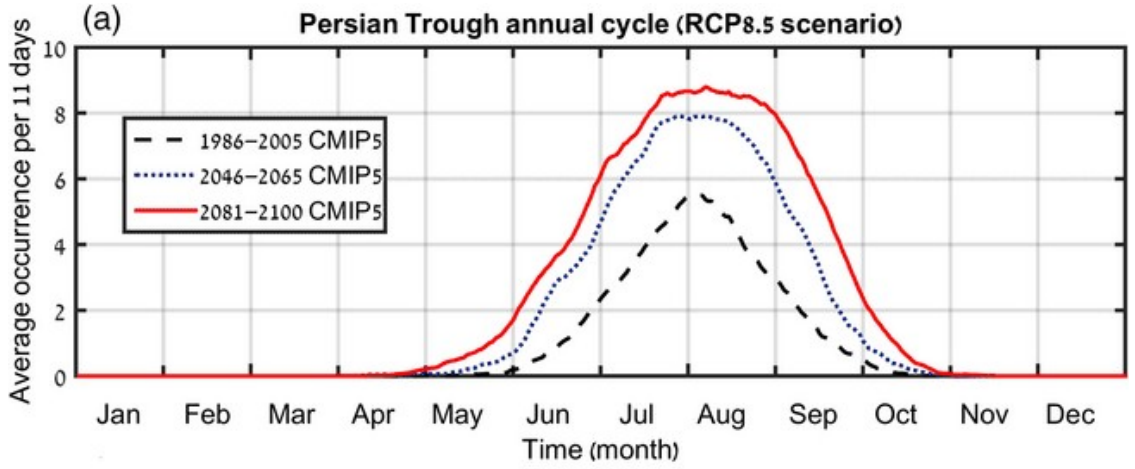
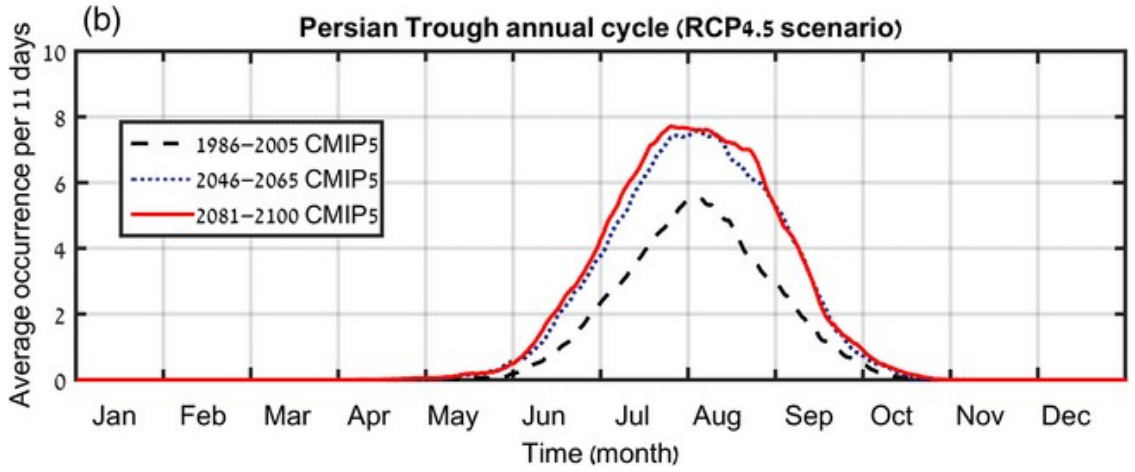
1. Projected changes in the frequency of the weak Persian Trough





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Summary of 1

- There is added value in convection-permitting simulations of wind in the Eastern Mediterranean.
- Significant projected changes in wind speed during summer.
- A significant increase in wind speeds (~ 1m/sec) near the surface and a decrease in wind energy potential at turbine height (~ - 7 GJ in six hours).
- At the surface due to changes in temperature gradients between land and sea.
- At turbine height due to the increased frequency of the weak Persian Trough.

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