

# FUTURE TRENDS OF NEAR-SURFACE WINDS OVER THE SOUTHWESTERN SOUTH ATLANTIC IN TWO REGIONAL CLIMATE MODELS



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Natália Machado Crespo<sup>1,2</sup>  
Natália Pillar da Silva<sup>2</sup>  
Ricardo de Camargo<sup>2</sup>  
Rosmeri Porfírio da Rocha<sup>2</sup>

<sup>1</sup>Department of Atmospheric Physics, Faculty of Mathematics and Physics, Charles University, Czech Republic

<sup>2</sup>Departamento de Ciências Atmosféricas, Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, Brazil



## INTRODUCTION

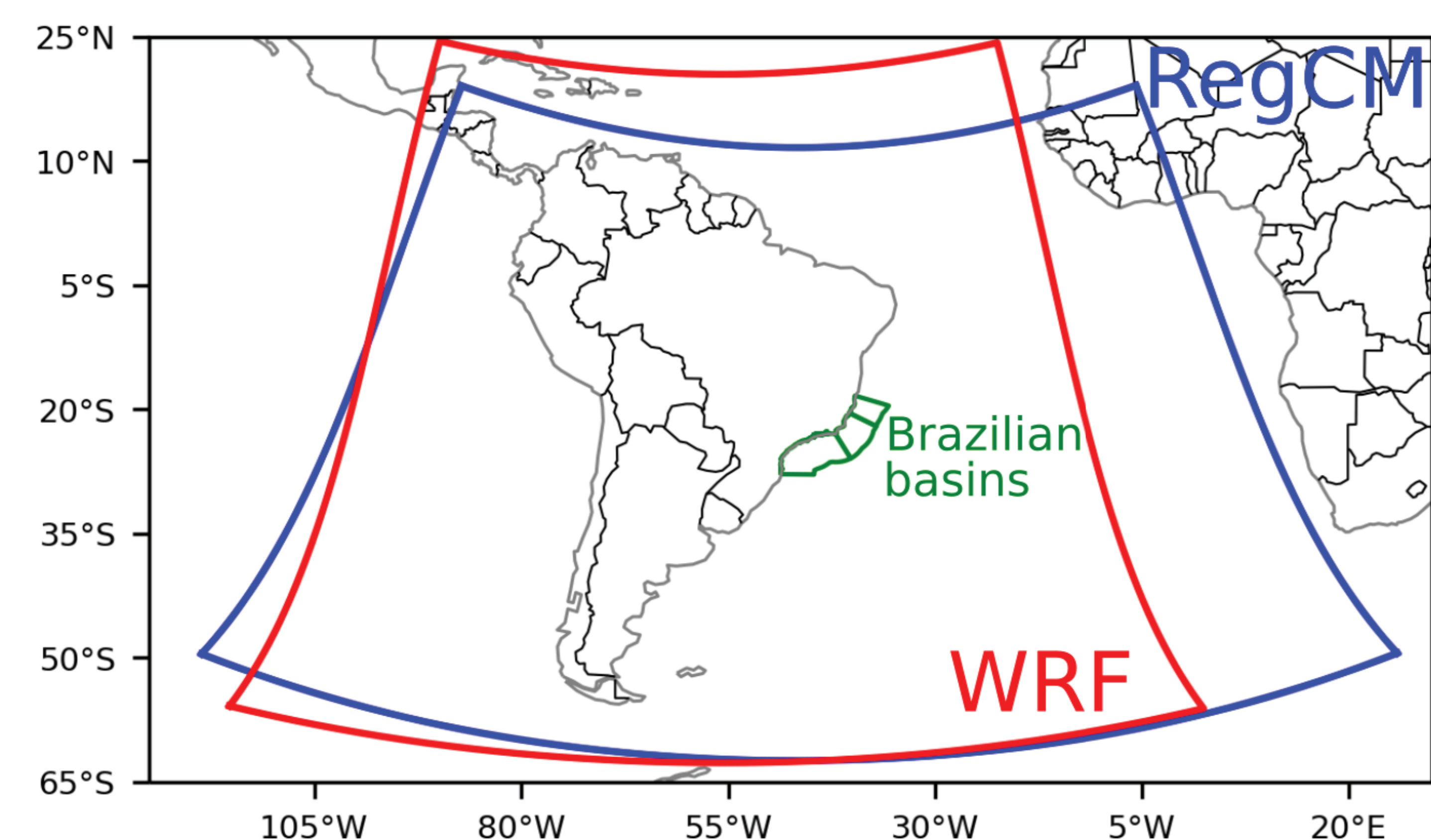
Near-surface winds near coastal areas affect the population living nearby as also the energetic sector, such as oil and wind power industries.

The project Western South Atlantic Climate Experiment [1] provided sets of regionalized climate projections with spatial and temporal resolutions compatible with projects of coastal and offshore structures, which have been used to guide adaptation and prevention for existing installations in three Brazilian sedimentary basins: Santos, Espírito Santo and Campos.

Here, we show projections of mean winds and their extremes for the middle of the century.

## DATA AND METHODS

REGIONAL MODELS: RegCM4.7 and WRF3.8



BOUNDARY CONDITIONS: global climate models HadGEM2-ES and MPI-ESM-MR in the RCP8.5 scenario [2]

PERIODS: present 1979-2005; future 2031-2060

ANALYSIS: climatological trends (future minus present) of annual mean wind speed (WS) and extreme threshold (95th percentile)

TWO SETS OF RESULTS FOR EXTREMES: non-adjusted and adjusted wind speed. The adjustment methodology can be found in [3]; in this case, the parameters were estimated only for upper quantiles

### Acknowledgement

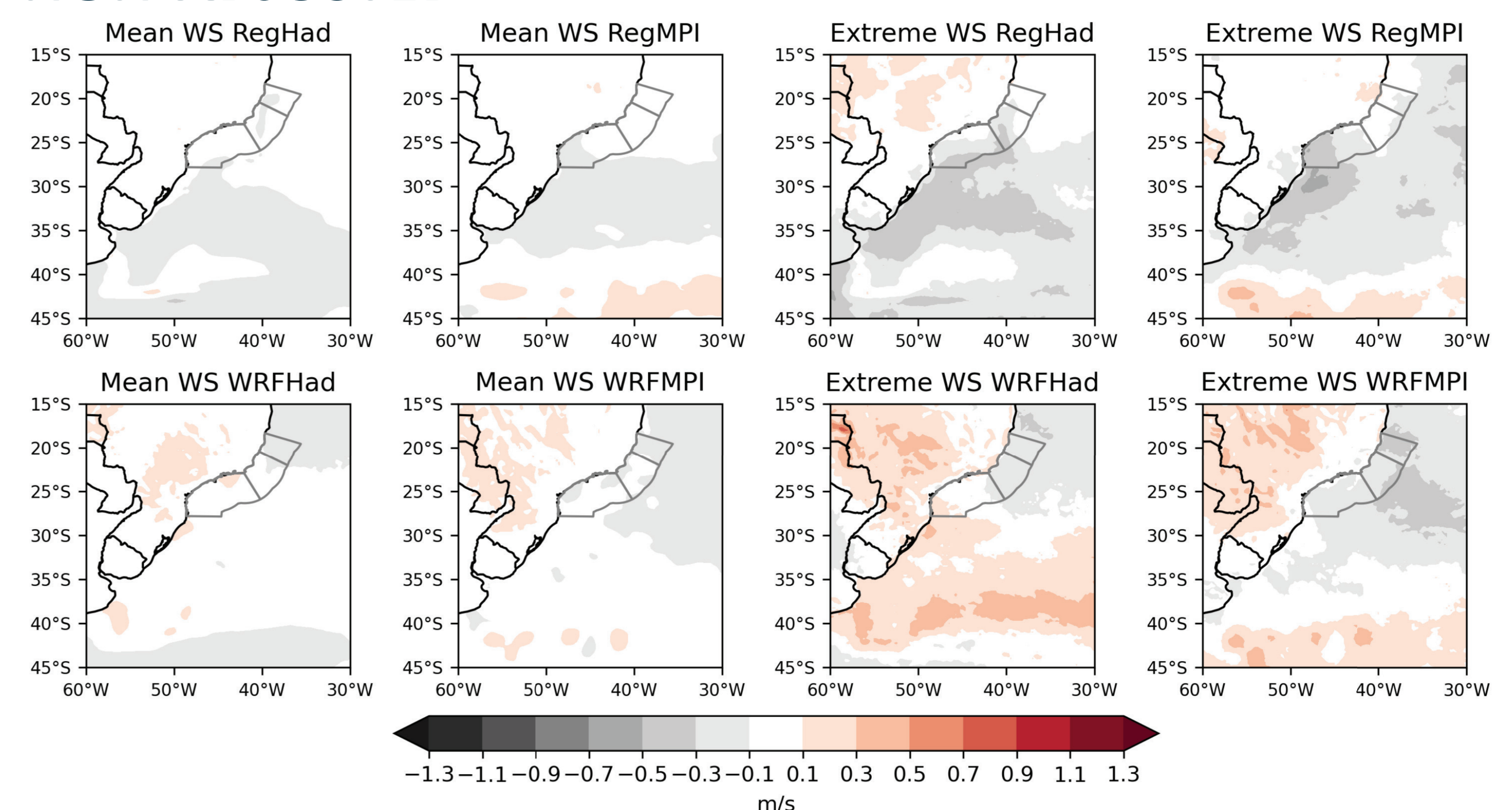
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### References

- [1] Crespo NM et al. (2022) <https://doi.org/10.1007/s00382-022-06340-y>
- [2] Taylor KE et al (2012) <https://doi.org/10.1175/BAMS-D-11-00094.1>
- [3] da Silva NP et al. (2022) <https://doi.org/10.1002/joc.7876>

## RESULTS

### NON-ADJUSTED



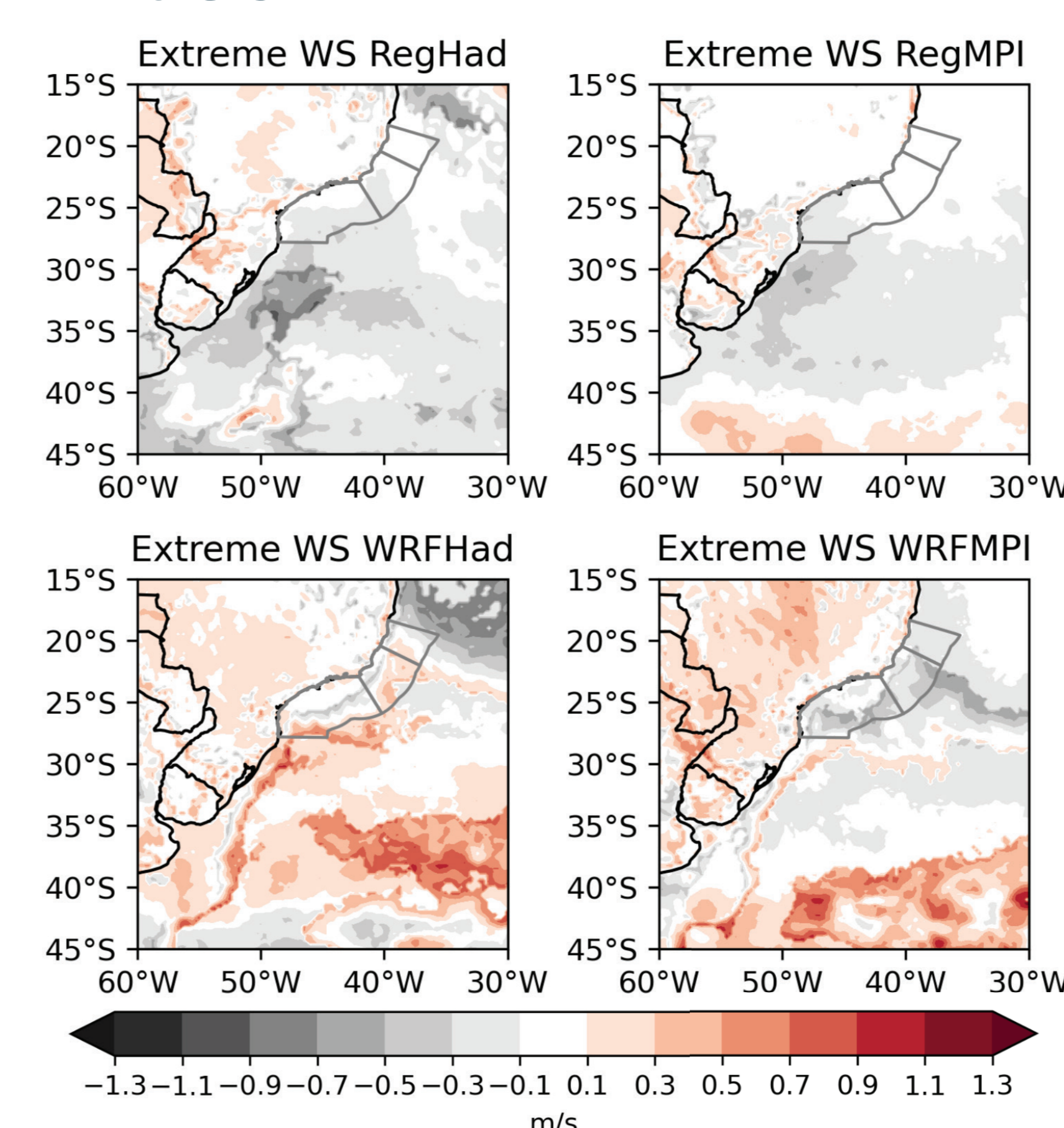
### MEAN WIND SPEED

Slight decrease (up to 0.3 m/s) over the ocean  
Positive and negative signals diverge according to the season and region; for instance, all simulations show an increase/decrease of the mean wind speed during spring/summer over the southeastern Brazilian basins

### EXTREME WIND SPEED

RegCM and WRF forced by HadGEM2 show opposite signals southern 25°S  
Future speeds vary up to 0.5 m/s near the coast and at mid-latitudes

### ADJUSTED



RegCM: smooth decrease in the wind speed signal over the southeastern Brazilian basins  
WRF: enhances the signals, especially near the coast and at mid-latitudes

## CONCLUSIONS

In general, a slight decrease in the wind speed is projected for the future over the southwestern South Atlantic.

The adjustment of extreme winds acted differently depending on the region and model. Over the southeastern Brazilian basins the signal of RegCM was smoothed while for WRF it was enhanced.