ASSESSMENT REPORT 2: Apr–May–Jun 2010, South Brazil

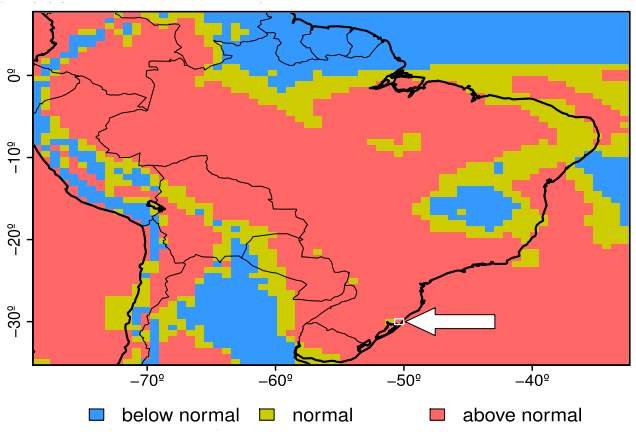
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Key event characterisation

Description

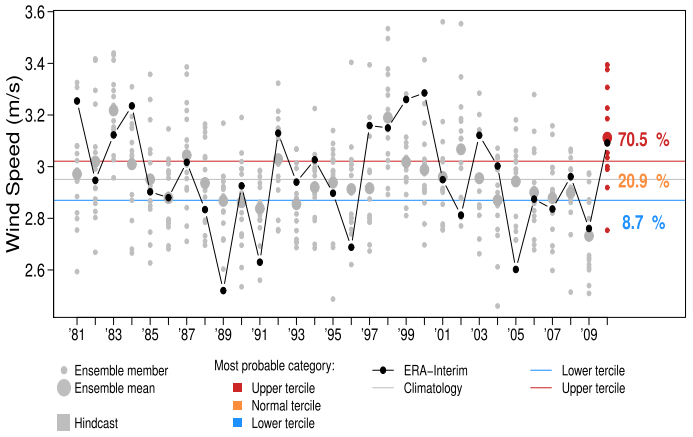
STAKEHOLDER: ALSTOM
AREA: South Brazil
COORDINATES: 30.35º–29.65ºS 50.72º–50.02ºW
SEASON: April, May, June (AMJ)
YEAR: 2010

South Brazil ERA–Interim 10m wind speed tercile categories (AMJ 2010) **a**



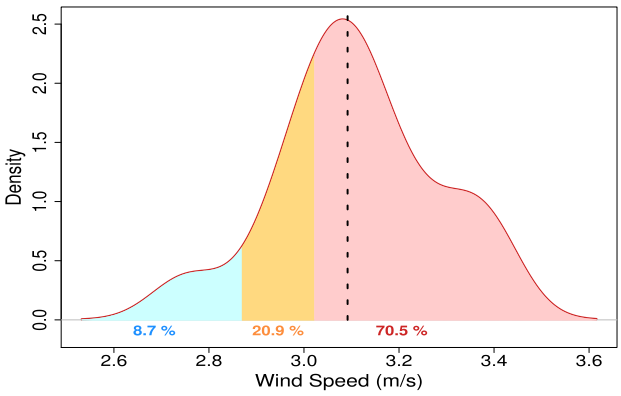
Seasonal wind speed prediction

b Time series of 10–m wind speed calibrated from ECMWF System 4 and ERA–Interim reanalysis (AMJ 1981–2010)



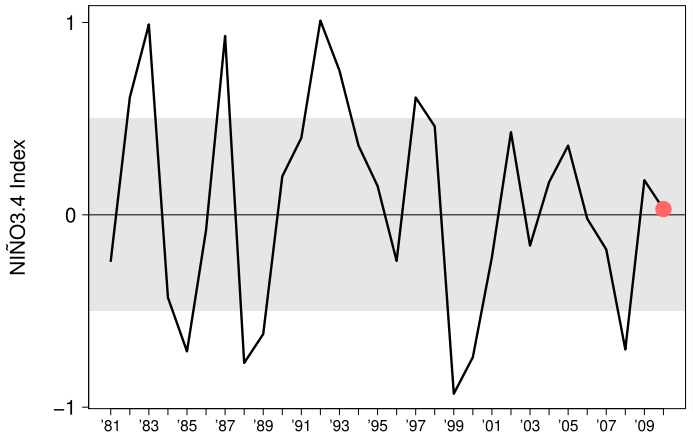
Skill assessment and probability density function (AMJ 2010 prediction) **c**

Skill: Corr=0.509 RPSS=0.133 CRPSS=0.101



Mechanisms driving seasonal wind speed variability

d Time series of the Oceanic Niño 3.4 Index (ONI) (AMJ 1981–2010)



Impact of the Niño 3.4 on the 10–m wind speed (AMJ 1981–2014) **e**

Climate driver was not significant during this period

Figure a *shows the wind speed category (normal, above normal or below normal) observed during the particular key event analized. The region of interest is highlighted with a white rectangle and an arrow. Using climatology to estimate the future behavior necessarily assumes that all three wind speed categories are equally probable.*

Most of Brazil displays above normal wind speeds, except for one region in the North and another in the South East, which show below normal winds, surrounded by normal winds. The grid cell to the left of the selected zone displays normal winds. The selected area in the South experienced above normal wind speed. Climatology would have **underestimated** wind speeds for this area.

Figure b *shows the European Center for Medium-range Weather Forecast (ECMWF) System 4 (S4) seasonal prediction. The reference (ERA-Interim) is shown in black. Hindcasts (grey) are shown from 1981 up to the previous year to the key event. The ECMWF S4 prediction for the key event is shown the last position, along with the likelihood of wind falling into each of the three categories (normal, below normal, and above normal), depending on the amount of members inside each category.*

The ECMWF S4 predicted that the most likely category would have been the above normal one (70.5% probability), followed by normal (20.9%) and below normal (8.7%). This was **in agreement** with the ERA-Interim reanalysis data for that region (black dots), and is thus a closer estimate than climatology alone (Figure a).

Figure c *shows the probability density function of the forecast, for better appreciation. Three skill measures are provided above: correlation, Ranked Probability Skill Score (RPSS) and Continuous Ranked Probability Skill Score (CRPSS). Area (i.e., probability) for each tercile category is shaded in a different color. ERA-Interim value is given as a black dashed line.*

Skill scores are above zero, which implies that the forecast performs better than a climatological forecast for this specific location and season. Note how the ERA-Interim value falls inside the most likely category.

Figure d *shows the value of a relevant climate driver for the region (see Figure e). Depending on the region, El Niño or the North Atlantic Oscillation (NAO) indices are shown. The value for the key event is shown as a red circle. The area shaded in grey covers the central normal category, i.e., values outside this area are either above normal, or below normal.*

For the 2010 AMJ season there was no El Niño phenomenon taking place, and thus it didn't exert any influence on wind speed.

Figure e *shows the impact the climate driver has in each region of the world, by either increasing (red hues) or decreasing (blue hues) wind speed (in m/s). Locations at which this impact is significant at the 95% confidence level are overlaid with dots.*

Since the Oceanic Niño Index (ONI) was close to zero, no effects upon wind are shown.

For additional information about data and methods for the case studies please see
http://www.bsc.es/ESS/sites/default/files/imce/Information_Assessment_KeyEvents.pdf

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