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The impact of global warming on extreme precipitation of two metropolitan regions in Southeastern Brazil

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World's fast-growing urban areas, especially in developing countries, will likely suffer from the consequences of climate change, a major issue facing human societies. The projected impacts are likely to require some adaptation, which in turn is based on future projections of whether adaptive capacity assets will be drawn upon in times of need. The southeastern region of Brazil is affected in the summer season by a persistent system, the South Atlantic Convergence Zone (SACZ), which is a northeast-southeast band of cloudiness and precipitation that extends from the Amazonia to the ocean. This system has convective clouds that can produce heavy and persistent rainfall over the region and causes flooding and landslide with large impacts on society. On the other hand, the absence of this system can cause long dry periods and affect the economy, agriculture and water resources. The effect of global warming induced by the increase of greenhouse gases can increase the frequency and intensity of precipitation extremes. The changes would affect the population more vulnerable to the impacts of extreme weather and climate. In this study, projections of precipitation over two metropolitan regions of São Paulo State, in the southeastern Brazil, are analyzed with the Eta regional model. One region is located at the interior (Campinas) and the other one at the ocean coast (Baixada Santista). Simulations and projections are obtained from four integrations (members) of the Regional Eta model considering the base period of 1961-1990 and the projections for the period of 1911 to 2100. An evaluation of the model shows that the annual cycle is better represented in Campinas than in Baixada Santista. This is expected, considering that the latter region is situated very close to mountains that could not be very well resolved by the model. Even so, the variability of the annual cycle is represented, with higher precipitation in the summer and lower in the winter. In both regions the projections show an increase of mean rainfall during summer and autumn in the future. In the winter and spring, the members show different results, increasing the uncertainties. The projections of frequency distribution show in general, in the two places, an increase in number of days without rain, a reduction of days with light rains and an increase of days with heavy rain. This is in agreement with other studies in other regions, which show an increase in the extremes, favorable for flooding and droughts.