Recent hydrological droughts in Brazil and their impacts on energy security

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Abstract

Brazil is heavily reliant on water resources. Hydroelectric plants generate about 64% of all electricity consumed. To increase yield capacity, a 2050 expansion is also planned. 78% of water used is for agriculture (irrigation and livestock), 9% for industry, and 9.1% for urban supply. However, the country has endured the worst droughts in recorded history over the last two decades, resulting in severe socioeconomic and environmental impacts. The purpose of this study was to determine the current state of knowledge regarding hydrological drought patterns, hydrometeorological factors, and their effects on the country's hydroelectric power plants. Droughts have occurred in most of Brazil's regions since 2014/15, causing severe impacts in many of the basins studied. Now that most hydroelectric power plants are operating at a fraction of their total capacity, the country's hydroelectric generation is being impacted.

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Difference in mean precipitation Nov/01 to Mar/31:
(2013-2021) – (1999-2013)

Difference in mean precipitation DJF:
(2013-2021) – (1999-2013)

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