Seminar “Ocean, Ice and Atmosphere”,
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Record Warmth and Unprecedented Drop in Equatorial Atlantic Sea Surface Temperatures in 2024

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From February to March 2024, the equatorial Atlantic experienced its warmest phase in at least 40 years, reaching sea surface temperatures of more than 30°C. This extreme warm event was triggered by a favorable combination of unusual winds in the western equatorial Atlantic and the reflection of oceanic waves at the western boundary. The combination of these two processes led to an exceptionally strong oceanic wave that increased the amount of warm water in the upper ocean in boreal spring. In May, a sudden strengthening of the winds triggered a wave of opposite sign which not only terminated the warm event, but further caused an unprecedented fast swing to a cold phase which lasted from June to August. This cold event did not fully develop into an Atlantic Niña due to (a) weak interaction between the ocean and the atmosphere, (b) atmosphere-induced upper-ocean warming, and (c) an increase of warm water in the upper ocean in August due to a boundary-reflected oceanic wave. Nevertheless, the cold event is consistent with a northward shift of the tropical rainband, increased rainfall over West Africa, Sahel, and Sahara, reduced rainfall over the Gulf of Guinea, and an earlier onset of the West African monsoon.