SUPPLEMENT

EXPLAINING EXTREME EVENTS OF 2015 FROM A CLIMATE PERSPECTIVE

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Cover credits:
Front: ©Photo by Joe Raedle/Getty Images—A vehicle drives through flooded streets The flood was caused by a combination of the lunar orbit which caused seasonal high tides and what many believe is the rising sea levels due to climate change. (on September 30, 2015, in Fort Lauderdale, Florida) South Florida is projected to continue to feel the effects of climate change, and many of the cities have begun programs such as installing pumps or building up sea walls to combat the rising oceans.

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S13. THE LATE ONSET OF THE 2015 WET SEASON IN NIGERIA

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This document is a supplement to "The Late Onset of the 2015 Wet Season in Nigeria" by Kamoru A. Lawal, Abayomi A. Abatan, Oliver Angélil, Eniola Olaniyan, Victoria H. Olusoji, Philip G. Oguntunde, Benjamin Lamptey, Babatunde J. Abiodun, Hideo Shiogama, Michael F. Wehner, and Dáithí A. Stone (*Bull. Amer. Meteor. Soc.,* **97 (12),** S63–S69) • ©2016 American Meteorological Society • DOI:10.1175 /BAMS-D-16-0131.2

Rainfall deficits observed over Nigeria during April–May 2015 onset period may be as a result of tropical atmospheric internal variability. In March, a deepening low (Lavaysse et al. 2009) spanning across the Sahel from Sudan (Fig. S13.1a) and intertropical discontinuity (ITD) advancement to about 1° north of its normal latitudinal positions (Fig. 13.1a in the main document) were observed. These made southwesterly trade winds penetrate deeply inland to about 12°N (Fig. S13.1a), aiding massive moisture influx (Omotosho 2008; Omotosho and Abiodun 2007) which resulted in the above-normal rainfall observed over large parts of Nigeria (Fig. S13.1b). Hence, false onset of wet season was observed in March (Figs. S13.1c,d). In April, northern midlatitude pressure strengthened (Fig. S13.1e) and this affected the usual latitudinal position of the ITD (Fig. 13.1a of the main document). Dry northeasterly trade winds strengthened and blew up to the coast of Gulf of Guinea (Fig. S13.1e). Pronounced dry spells of more than 20 days were observed over Nigerian cities (Figs. S13.1c,d). In May, southern midlatitude pressure strengthened; moisture-laden maritime southwesterly trade winds pushed back the continental northeasterly to the far north of the country (Fig. S13.1f). The number of days with positive rainfall anomalies increased in the south (Fig. S13.1c). Even though regional SST anomalies in April–May were mostly positive (Figs. S13.1g,h), rainfall was still below normal over Nigeria, implying that above-normal SST contributed little or no effect to the rainfall distribution during these periods in question, while the tropical atmospheric fluid dynamics did.

REFERENCES

Lavaysse, C., C. Flamant, S. Janicot, D. J. Parker, J.-P. Lafore, and B. Sultan, 2009: Seasonal evolution of the West African heat low: A climatological perspective. *Climate Dyn.*, **33**, doi:10.1007/s00382-009-0553-4.

Omotosho, J. B., 2008: Pre-rainy season moisture build-up and storm precipitation delivery in the West Africa Sahel. *Int. J. Climatol.*, **28**, 937–946, doi:10.1002/joc.1548.

Omotosho, J. B., and B. J. Abiodun, 2007: A numerical study of moisture build-up and rainfall over West Africa. *Meteor. Appl.*, **14,** 209–225, doi:10.1002/met.11.

Simmons, A., S. Uppala, D. Dee, and S. Kobayashi, 2007: ERA-Interim: New ECMWF reanalysis products from 1989 onwards. *ECMWF Newsletter*, No. 110, 25–35.

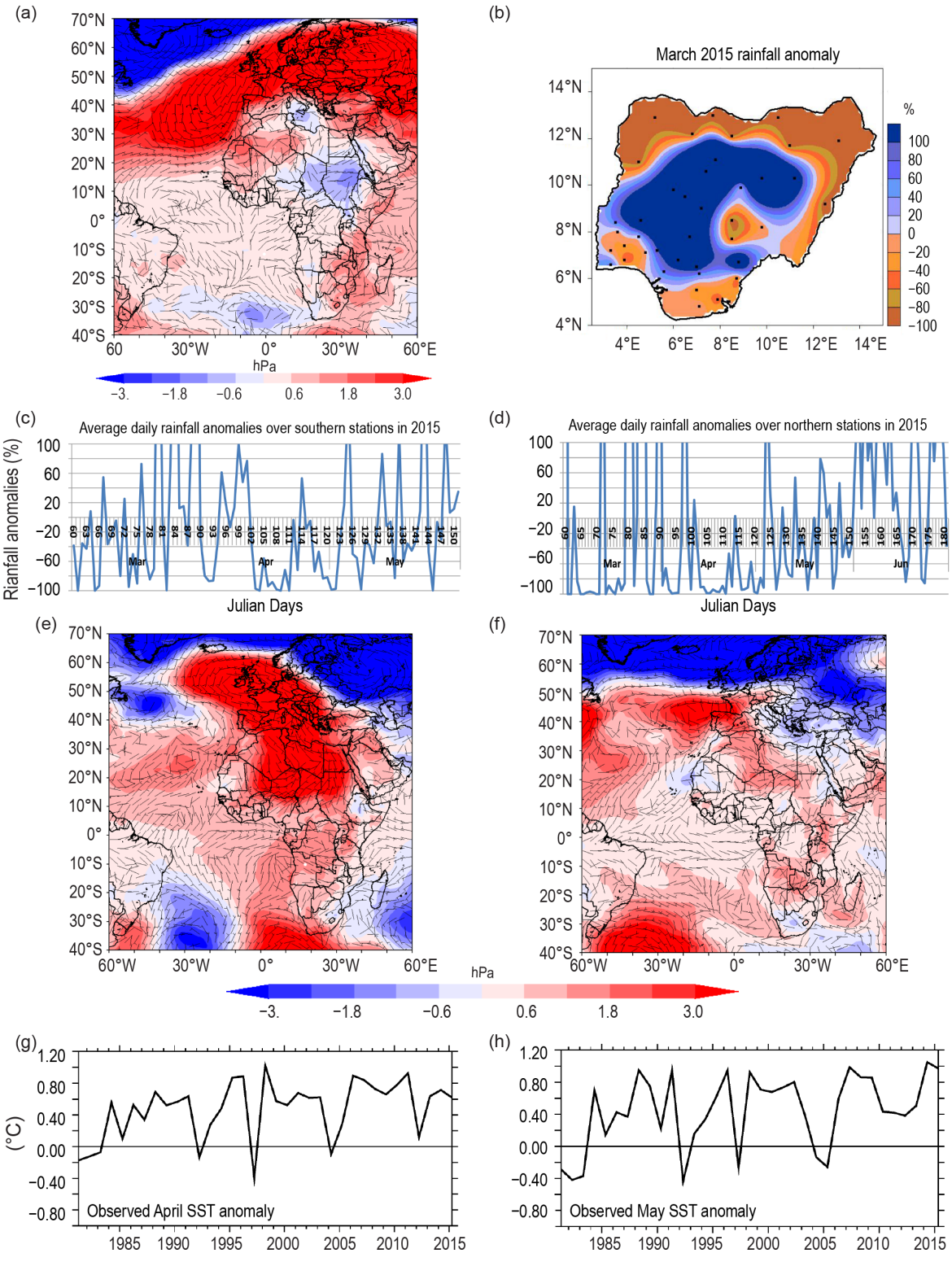

Fig. S13.1. (a) Observed anomalies of mean sea level pressure (shaded; hPa) and wind (vectors) [obtained from the ERA-Interim reanalysis (Simmons et al. 2007)] over Africa in March 2015. (b) Rainfall anomalies (shaded; %) over Nigeria in March 2015. Average of daily rainfall anomalies (%) over (c) southern 28 (cities south of 9°N; March–May 2015) and (d) northern 24 (cities north of 9°N; March–June 2015). As in (a) but for (e) April and (f) May 2015. Observed interannual anomalies of SST (°C) over the eastern parts of Atlantic Ocean (9°S–5°N, 5°W–10°E) from 1981–2015 in (g) April and (h) May.