d12 Monitoring global drought using the self-calibrating Palmer Drought Severity Index

—J. Barichivich, T. J. Osborn, A. R. Friedman, I. Harris, G. van der Schrier, and P. D. Jones

The 2025 update of the self-calibrating Palmer Drought Severity Index (scPDSI) indicates that the global extent of drought conditions (Fig. 2.d.12.1) during 2025 was notably above the long-term 1950–2025 average. Nevertheless, global drought area declined slightly compared with 2024 and remained below the preceding peak observed during the second half of 2023 (Barichivich et al. 2025). Global drought area expanded rapidly after mid-2019 and since then it has remained above the long-term 1950–2025 mean (Fig. 2.d.12.1). During 2025, drought conditions of at least moderate intensity (scPDSI ≤−2) affected 22%–25% of the global land area during the year, while severe or worse drought (≤−3) and extreme drought (≤−4) affected approximately 10%–12% and 3%–5% of the land area, respectively (Fig. 2.d.12.1).

The global distribution of drought during 2025 (Plate 2.1w) shows several large dry regions across the Northern Hemisphere midlatitudes and parts of South America and Africa. Severe to extreme drought conditions occurred across the Mediterranean basin, central and south eastern Europe, northern parts of the Middle East and Central Asia, northeastern South America, western North America, and portions of west and southern Africa and Australia (Plate 2.1w). Notable drought relief occurred across southern Africa, Central America, and parts of northwestern South America (Fig. 2.d.12.2).

In the Americas, drought eased in Mexico and persisted across northern North America while autumn rain eased the drought in western United States (sections 2d5, 2d11) but this was too late for the 2025 annual scPDSI to move out of drought conditions. Across South America, widespread extreme drought conditions affected most of central and northern Amazonia and parts of northeastern Brazil, reflecting the continuation of regional precipitation deficits following the severe drought of 2023/24 that led to critically low river levels in the dry season of 2024 (Barichivich et al. 2025). In contrast, parts of northwestern Amazonia, southern Brazil and the La Plata basin experienced near-normal to relatively wetter conditions.

Across Europe and the Mediterranean, drought conditions were among the most pronounced globally (Plate 2.1w) due to a combination of precedent moisture deficits (Barichivich et al. 2025), above-average temperatures (section 2b4), and rainfall deficits (section 2d5; Toreti et al. 2025). The scPDSI pattern shows severe to extreme drought extending across eastern, southern, and southeastern Europe, including the Balkans, Greece, and parts of Türkiye. Compared to conditions in 2024, central Europe experienced stronger intensification of drought in 2025 than any other region (Fig. 2.d.12.2). This was fueled by a very dry spring and coincided with more-than-usual sunshine amounts throughout the year. In North Africa, severe-to-extreme drought persisted along the Mediterranean coast from Morocco to Tunisia, though its intensity decreased relative to 2024. Severe drought also affected parts of the Middle East during 2025, including Syria where it contributed to major agricultural losses (FAO 2025).

Across Asia, extensive dry anomalies stretched from the Caspian region through Kazakhstan into Mongolia and northern China (Plate 2.1w). In contrast, parts of South and Southeast Asia experienced relatively wetter conditions associated with regional monsoon variability. In Australia, moderate drought persisted along the western and southern coastal zones, although drought conditions were less extensive than in recent years.

Hydrological drought results from periods of abnormally low precipitation, sometimes amplified by increased evapotranspiration associated with higher temperatures. Here, global drought conditions are estimated using the self-calibrating Palmer Drought Severity Index (scPDSI; Wells et al. 2004; van der Schrier et al. 2013) derived from precipitation and Penman-Monteith potential evapotranspiration from the Climatic Research Unit gridded Terrestrial Series (CRU-TS 4.10) dataset (Harris et al. 2020).