

24 **ABSTRACT**

25 A theoretically expected consequence of the intensification of the hydrological cycle under
26 global warming is that, on average, Wet regions get Wetter and Dry regions get Drier (WWDD).
27 Recent studies, however, have found significant discrepancies between the expected pattern of
28 change and observed changes over land. We assess the WWDD theory in four climate models.
29 We find that the reported discrepancy can be traced to two main issues: (1) unforced internal-
30 climate variability that strongly affects local wetness and dryness trends and can obscure
31 underlying agreement with WWDD, and (2) dry-land regions are not constrained to become drier
32 by enhanced moisture divergence since precipitation must exceed evaporation over multi-annual
33 time-scales. Over land, where the available water does not limit evaporation, a “wet gets wetter”
34 signal predominates. On seasonal time scales, where evaporation can exceed precipitation, trends
35 in wet season becoming wetter and dry season becoming drier are also found.

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