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Towards attributing change in tropical and subtropical precipitation

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Precipitation changes are notoriously highly variable, and climate models misplace circulation features, making it difficult to evaluate if mechanisms of precipitation change are well reproduced in climate models. Several methods have been developed to detect externally forced precipitation change tracking circulation features rather than specific locations. For example, analysis of monthly ascending and descending regions in reanalysis show the increase of rainfall in ascending regions. Analysis of wet and dry regions in GPCP blended data shows that if the locations of wet and dry regions are tracked from month to month then trends over the past 3-4 decades can be attributed to a combination of human influences and the recovery from drying associated with the Mount Pinatubo eruption in wet regions. In response to volcanic eruptions, wet regions tend to dry and dry regions may get wetter, indicating a reduced moisture transport to the wettest regions of the tropics under strong volcanic forcing. However, this is also impacted by the hemispheric characteristics of the eruptions.