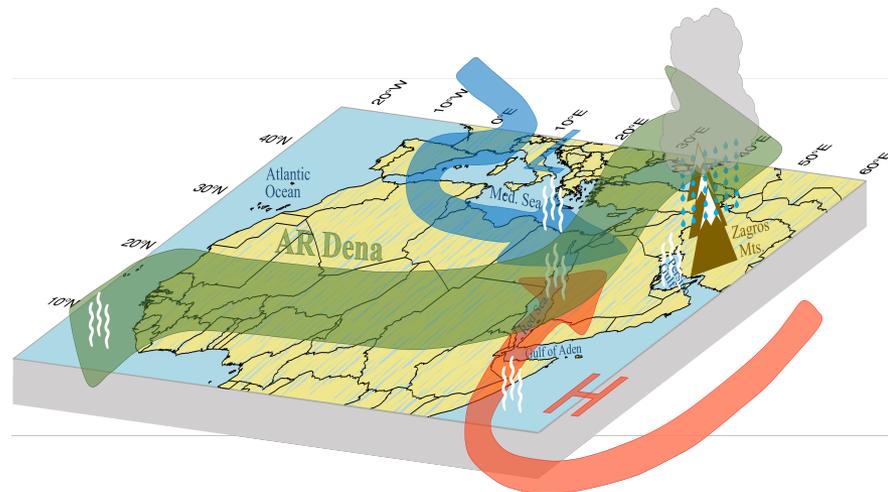
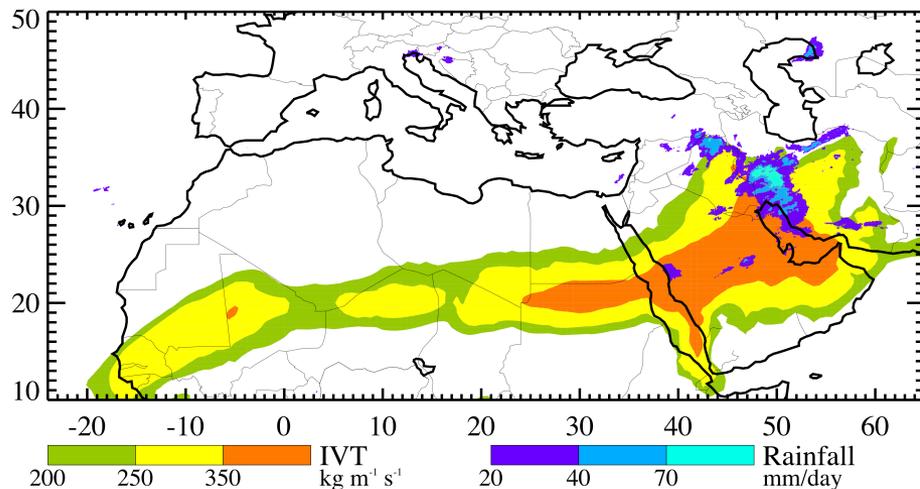


Rare Atmospheric River Caused Record Floods Across the Middle East



Atmospheric river (AR) Dena, originating in the tropical Atlantic Ocean, led to unprecedented flooding in late March 2019 across several Middle Eastern countries and caused enormous damages and casualties, particularly in Iran. **Left:** The AR pattern, captured by IVT from MERRA-2, and the associated record rainfall, detected by IMERG “late run”. The intense rains made the 2018/19 rainy season the wettest in the past four decades, in sharp contrast with the prior year, which was the driest over the same period. **Right:** Features contributing to AR Dena (green arrow), including low pressure (blue arrow) and high pressure (red arrow) associated with a midlatitude weather system and evaporation over the seas and oceans (wavy white lines).