Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09334, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09334
EGU General Assembly 2008

Meteorological characteristics and hydrometeorological impacts of Atmospheric Rivers affecting the west coast of North America

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This presentation describes a phenomenon that is responsible for many extreme precipitation events and could be a key to understanding regional impacts of climate change on water resources. The low-level jet within the extratropical cyclone warm sector represents the primary region of water vapor transport in the cyclone. Because these regions are narrow relative to their length scale and are responsible for most of the poleward water vapor transport at midlatitudes, they are referred to as atmospheric rivers (ARs). Case-studies and multi-event composites highlight the key structural and dynamical characteristics of ARs. Their year-round occurrence, tendency for strongest transports to occur during the cool season, broad geographical distribution and hydrometeorological impacts upon landfall across western North America are described. Landfalling AR conditions favor strong orographic enhancement of precipitation and high melting levels, which combine to cause flooding, especially for stronger ARs, and yet are often difficult to predict on watershed scales. Additionally, climate models project future increases in the occurrence of AR-like water vapor-transports and extreme precipitation events in locations where such extremes often coincide with AR

landfall, in response to increasing greenhouse-gas concentrations.