

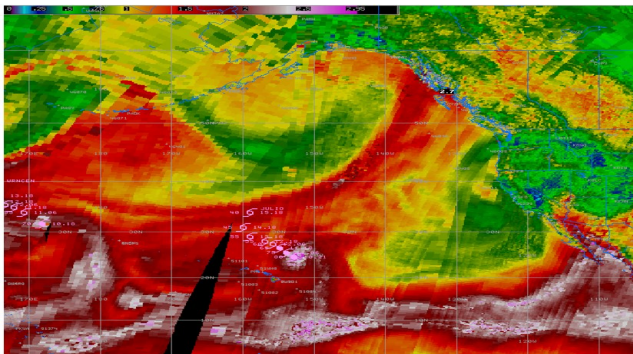


# Atmospheric Rivers



Juneau

**What is an Atmospheric River?** Atmospheric rivers are relatively narrow regions in the atmosphere that are responsible for most of the transport of water vapor from the tropics. Atmospheric rivers come in all shapes and sizes but those that contain the largest amounts of water vapor and strongest winds are responsible for extreme rainfall events and floods. This type of hydrologic event can affect the entire west coast of North America. These extreme events can disrupt travel, induce mudslides, and cause damage to life and property. Not all atmospheric rivers are disruptive. Many are weak and provide beneficial rain or high elevation snow that is crucial to the water supply.



The image on the left shows an atmospheric river that affected Southeast Alaska on 11-08-2014. The atmospheric river is marked by the narrow plume of subtropical moisture evident in the Total Precipitable Water field extending from the central Pacific northeastward through the Gulf of Alaska.

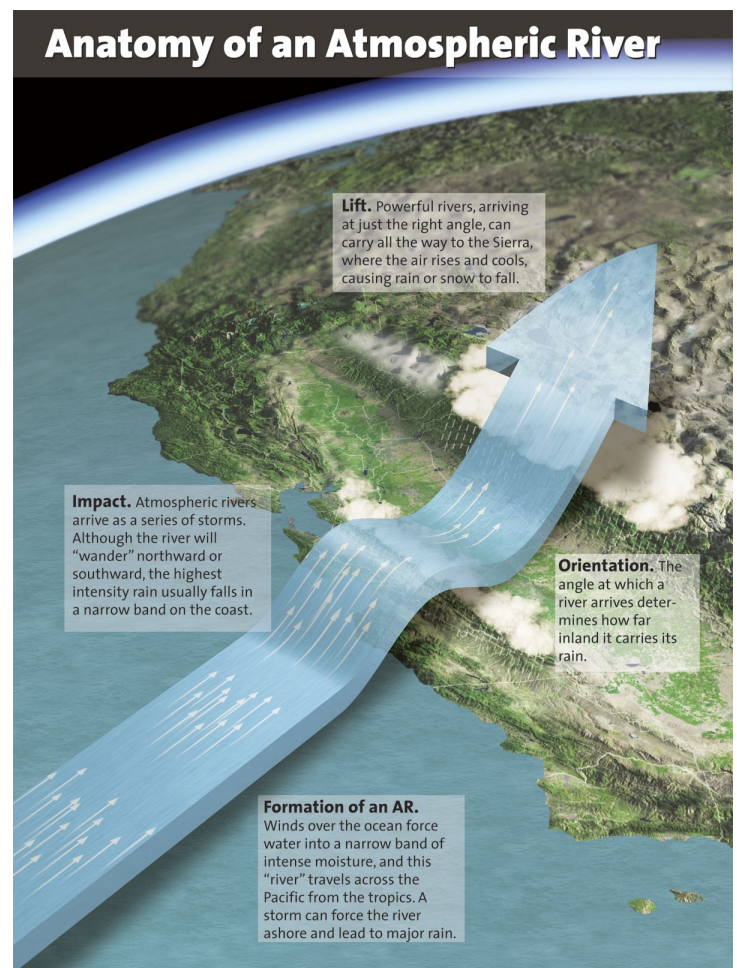
## Why do Atmospheric Rivers Occur in SE Alaska?

Due to its location on the western side of the North American continent, SE Alaska is often the target for powerful ocean storms that form over the western and central Pacific Ocean and move eastward, steered by the prevailing westerly upper level jet stream. These powerful low pressure systems often have strong fronts associated with them. Fronts act like a conduit to channel warm, moist air northward and eastward ahead of the low pressure system in what is called the “warm conveyor belt”.

The strongest fronts are also regions of strong winds in the lower portions of the atmosphere. The stronger the winds, the more moisture that can be transported.

If the lower level winds blow from a southerly or southwesterly direction, they are also perpendicular to the steep terrain of SE Alaska. As this happens, the warm moist air is forced to rise and rainfall amounts are enhanced.

These fronts often slow down or even stall over the eastern Gulf of Alaska as they encounter the higher terrain to the east. This can cause the duration of the heavy rainfall to be extended to a many as 1 to 3 days.



# Hydrology/River Products - Decision Tree And Product Meaning

	Event Likelihood	Possible	Possible	Certain	Certain
	Event Maturity	Days/Months Before	Hours/Days Before	Imminent or Occurring	Imminent or Occurring
		Initial and Update	Initial and Update Products	Initial Product	Update Product
Slow Rise	Moderate or Major Flood	Flood Outlook	Flood Watch	Flood Warning	Flood Statement
	Minor Flood	Flood Outlook	Flood Watch	Flood Advisory	Flood Statement
Rapid Rise	Minor Moderate or Major Flooding	Flood Outlook	Flash Flood Watch	Flash Flood Warning	Flash Flood Statement
	Significant Within Bank Rise (NO FLOODING EXPECTED)	River Statement	River Statement	River Statement	River Statement

## Hydrologic Outlook:

Products describing the possibility of flooding on a near-term forecast horizon, typically more than 24 hours from the event.

## River Statement/Special Weather Statement:

Products alert the public to changing river conditions but there is ***no threat of out of bank flooding.***

## Flood and Flash Flood Watch:

Are issued when flooding is possible, but not occurring at the present time.

## Flood Warning:

Are issued when flooding is imminent or occurring. The criteria are based on established "**moderate flooding**" levels for specific rivers, but the ***warning is an areal forecast*** as impacts play a role to protect threat of life and property.

## Flash Flood Warning:

Are issued this when a flash flood is imminent or occurring, these events last less than 6 hours.

## Flood Advisory:

Are issued when minor flooding is imminent or occurring. The criteria are based on established ***minor flooding levels*** when rainfall or snow melt causes water to pond on roadways, yards and/or small creeks and streams are near or at minor flood stage (nuisance flooding).

## Flood/Flash Flood Statement:

Are issued to update or cancel a flood/flash flood warning or flood advisory.

### How to read the hydrograph on the right:

- The blue line is the observed value from the river gauge.
- The magenta line is the forecast from the National Weather Service River Forecast Center in Anchorage.
- The colors represent different flood levels.
- Action Stage means: Stage at which some person or an agency needs to pay attention to the hydrologic situation.
- To view the real-time hydrographs for SEAK go to:  
<http://water.weather.gov/ahps2/index.phpwfo=pajk>

