AQPI Case Study

Winter 2022/2023 Atmospheric River Storms in Santa Cruz County

Advanced Quantitative Precipitation Information

SITUATION

When big storms like atmospheric river storms (ARs) hit California, current technology does not provide forecasters with the detailed information needed to inform reservoir operations, flood protection, combined sewer-stormwater systems and emergency preparedness. Accurate and timely precipitation information is critical for making decisions regarding public safety, infrastructure operations, and resource allocations.

During the winter of 2022-2023, 13 AR storms affected Santa Cruz County, causing widespread damage including coastal storm surge, flooding, evacuations, power outages, downed trees, and property damage leading to two Major Disaster Declarations. Storms destroyed two of the county's three remaining piers and left an indelible impression in the memories of those who lived through them. AR storms are difficult to forecast. Santa Cruz County's topography makes predicting their impacts even more challenging. Local rivers flow from steep mountains and rise and fall rapidly (particularly when soils are saturated), giving county emergency managers little time to make critical decisions that impact the welfare of the community, including evacuation and repopulation orders.

AQPI SYSTEM IN ACTION

AR Storms produced heavy rain in several locations, including neighborhoods adjacent to several creeks and rivers within Santa Cruz County. The AQPI X-Band radar provided more detailed precipitation data in specific areas, which helped County emergency managers decide whether to evacuate, and especially when it was safe to allow people to return home.

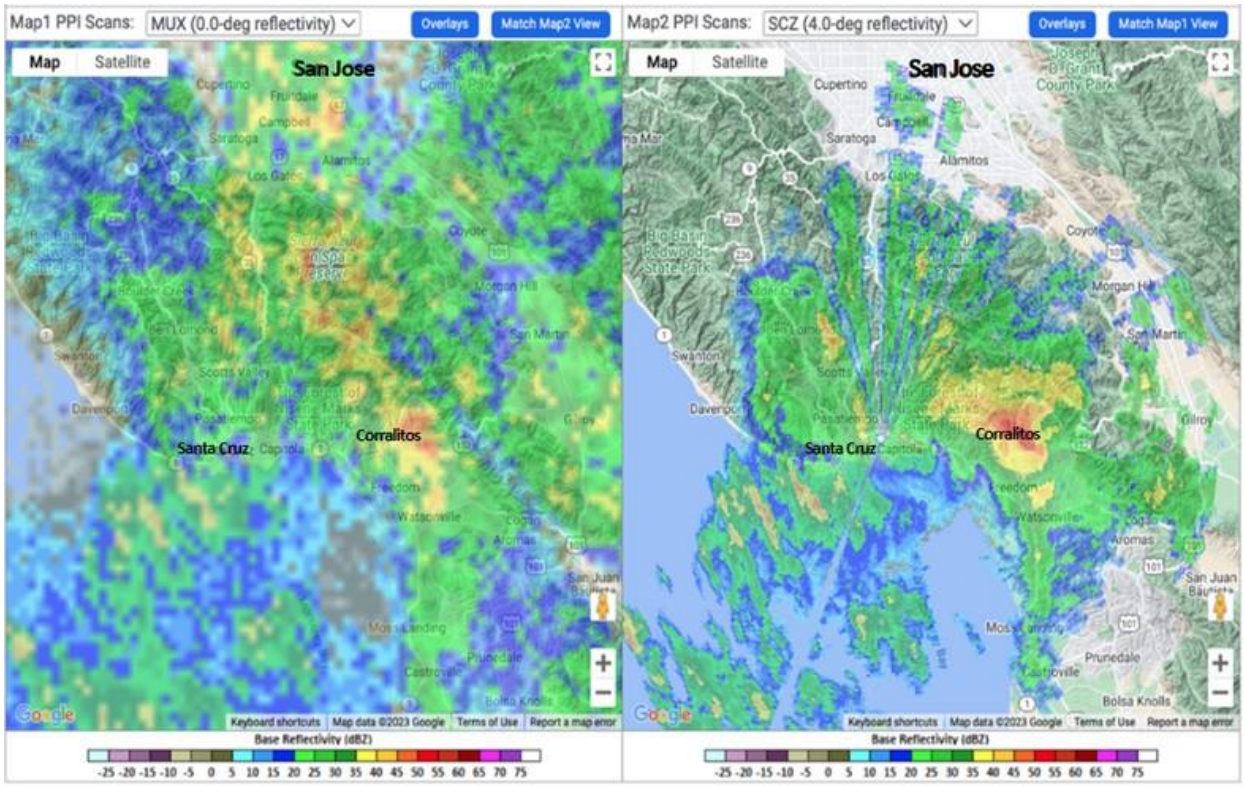
Bates Creek flooding on March 10, 2023

Video: https://wp.me/ay5gC-bs6

Bates Creek flooded in the early morning hours of March 10, 2023. The creek is a minor tributary of Soquel Creek, which is a local river that drains to the sea through Capitola Village. Previously, Bates Creek passed through a large culvert, which was overwhelmed by an unexpected and significant amount of rainfall, taking out the Main Street in Soquel and stranding residents of 450 homes. Main Street was their only way out. The County undertook emergency repairs to restore access.

Photo credit: Lookout Santa Cruz, https://lookout.co/santacruz/

Radar Imagery - Santa Cruz Region | March 10, 2023



NEXRAD Radar **AQPI Radar**

March 10, 2023 - Radar imagery from the Monterey NEXRAD (MUX; left) and Santa Cruz AQPI X-band (SCZ; right) around 2:00 am PT. The high intensity storm cell near Corralitos was more clearly identified by the AQPI radar, and produced heavy rainfall, flash flooding, road washouts, and evacuations near Soquel, CA.

AQPI X-Band radar system provided higher resolution data, which helped the County to advise emergency managers and law/fire agencies on the best time to lift evacuation orders and warnings. Flood and emergency managers had access to better quality weather data and could make crucial decisions about the timing of evacuation orders and the allocation of resources. This saved time and money and helped protect the community.

AQPI SYSTEM INFORMATION

The Advanced Quantitative Precipitation Information (AQPI) system is a regional project that uses enhanced weather radar to track precipitation associated with atmospheric rivers. AQPI was funded in 2016 by a grant from the California Department of Water Resources (DWR) Integrated Regional Water Management Program (IRWM) and awarded to Sonoma Water and participating Bay Area agencies. The AQPI system provides X-Band and C-Band weather radar information that increases the accuracy of weather forecasting and response systems throughout the Bay Area. Improved forecasting assists flood agencies, emergency responders, wastewater plant managers, reservoir operators, and water managers in responding to extreme weather events in a timely fashion.

Contacts:

Dale Roberts | Sonoma Water
dale.roberts@scwa.ca.gov

Rob Cifelli | NOAA Physical Sciences Laboratory
rob.cifelli@noaa.gov

Resources:

Watch the radars in action now!
Real-Time Radar Display

NOAA AQPI Website
http://www.esrl.noaa.gov/psd/aqpi

Sonoma Water AQPI Website
https://www.sonomawater.org/aqpi