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Development of a Flash Flood Guidance System for the Zarumilla Transboundary River Basin in Ecuador and Peru

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Eylon Shamir, Ph.D,
EShamir@hrcwater.org

Hydrologic Research Center



DEVELOPMENT OF A FLASH FLOOD GUIDANCE SYSTEM FOR THE ZARUMILLA TRANSBOUNDARY RIVER BASIN IN ECUADOR AND PERU

Eylon Shamir, Theresa M. Modrick, Cristopher R. Spencer, and
Konstantine P. Georgakakos

HRC TECHNICAL NOTE NO. 83

Sponsored by
World Meteorological Organization
(Letter of Agreement Revised 9 October 2014)

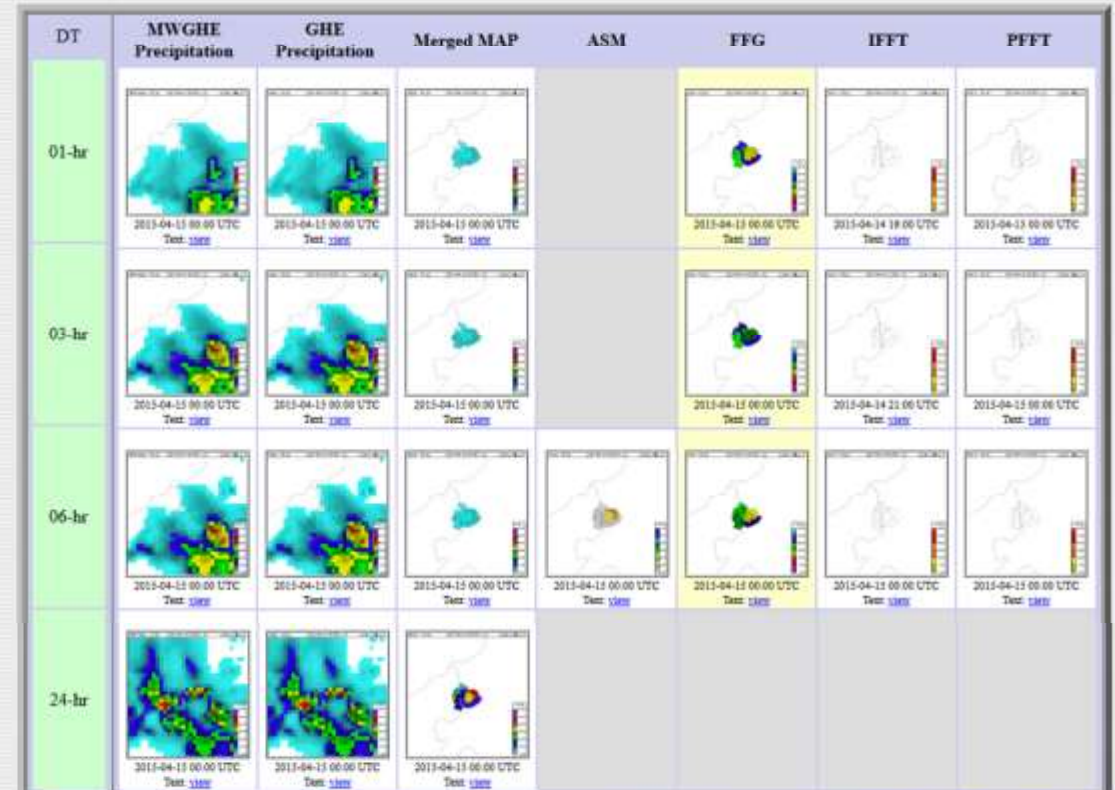


HYDROLOGIC RESEARCH CENTER
12555 High Bluff Drive, Suite 255, San Diego, CA 92130, USA

20 JANUARY 2016

SAMFFG - South America Flash Flood Guidance

Current Date: 2015-05-15 00:00 UTC Nav Date: 2015-04-15 00:00 UTC
 Year: 2015 Month: 04 Day: 15 Hour: 00 Submit
 -1 Month -1 Day -6 Hours -1 Hour +1 Hour +6 Hours +1 Day +1 Month
 Prev 6-hr Interval (18 UTC) Reset to Current Next 6-hr Interval (06 UTC)



Composite Product: [test](#), [CSV](#), [CSV/T](#)

SFTP data transfer (requires SFTP Client): [EXPORTS.ZARUMILLA.2015-04-15](#)

Surfnet Gauge Observations at 2015-04-15 00:00 UTC ERROR

Station Identifier	Station Name	Accumulated Precipitation (mm/30hr)	Airmax Temperature (C)	Barom	Latitude	Longitude	Elevation	Enable Precipitation Flag	Enable Temperature Flag
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Zarumilla River Basin ~900 km²

Basin Delineation

Validation

Stream network [DCW]

Google Earth

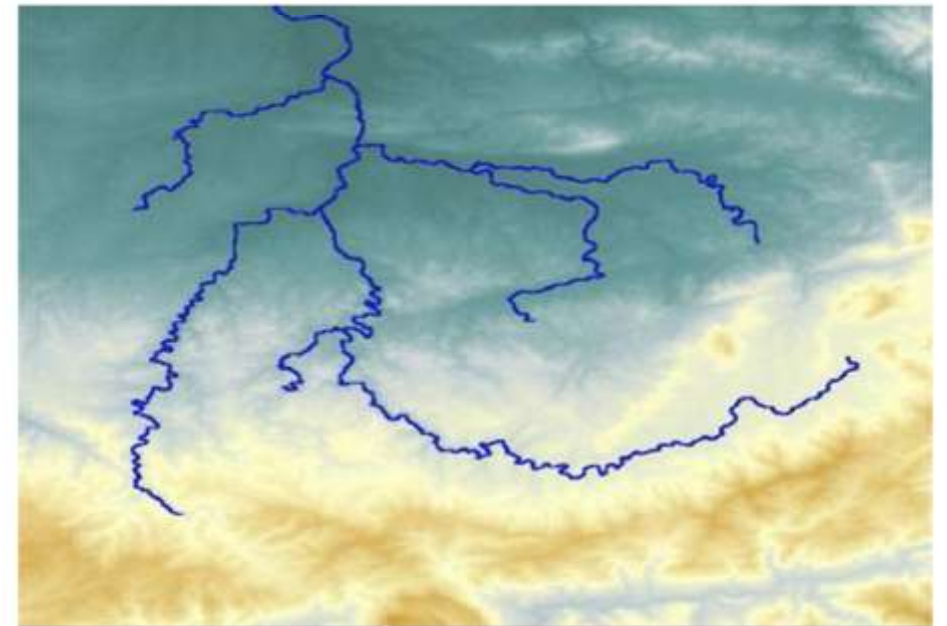
Comments from countries based on local surveys and maps

90 meter DEM from:

NASA's Shuttle Radar Topographic Mission [SRTM]



Average Basin Size 50 km²

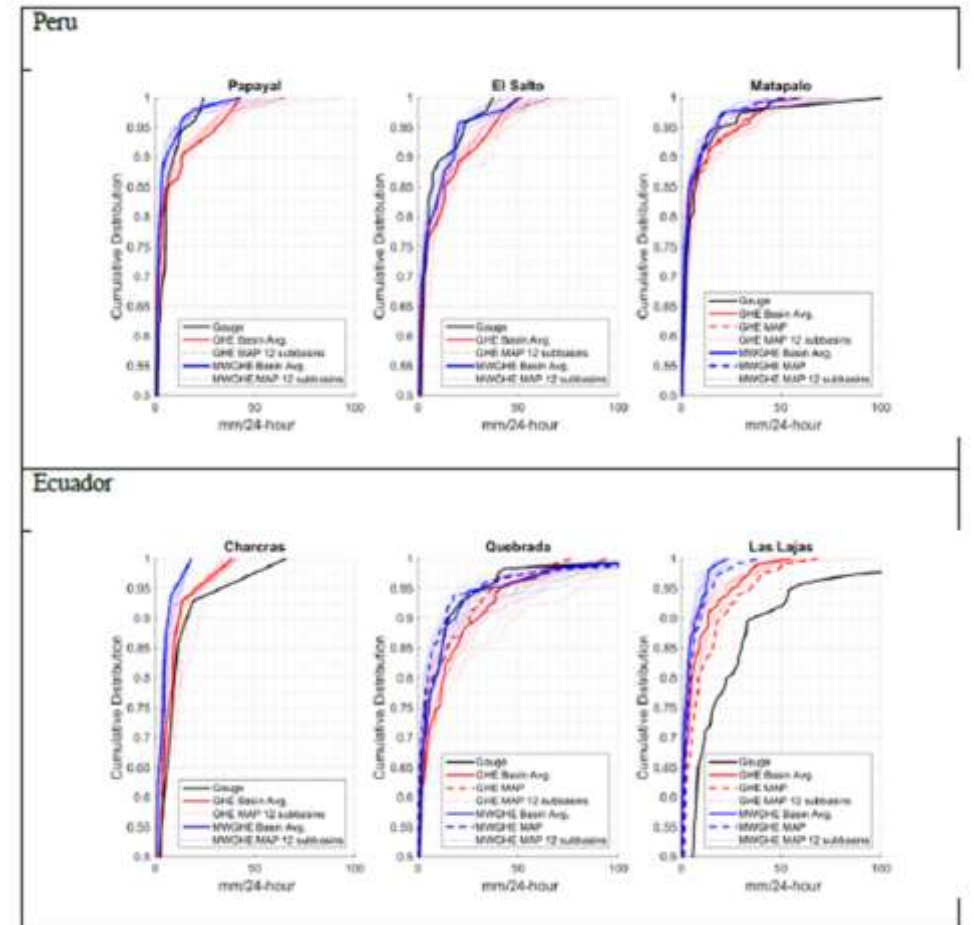
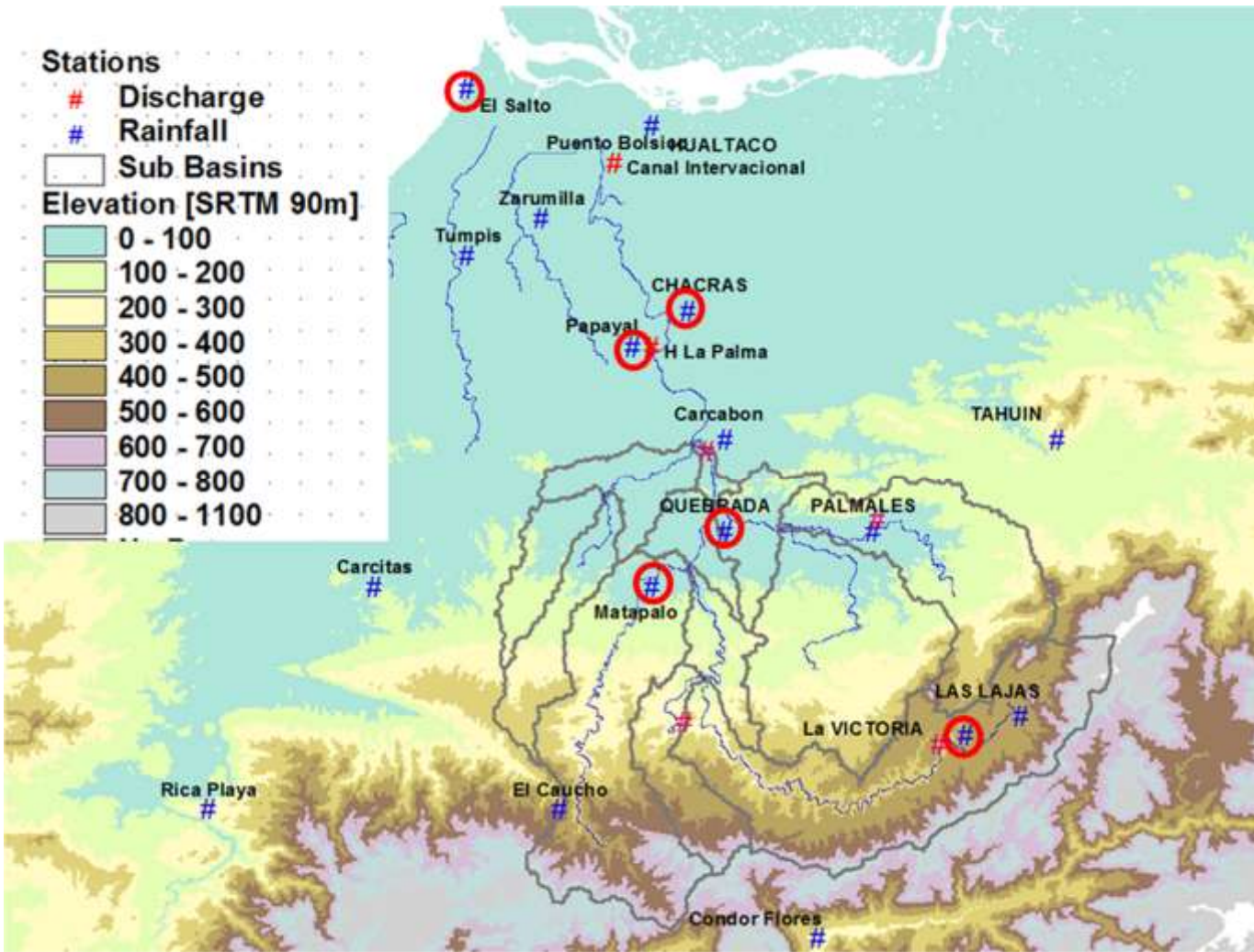


Satellite and Gauge Precipitation Estimates

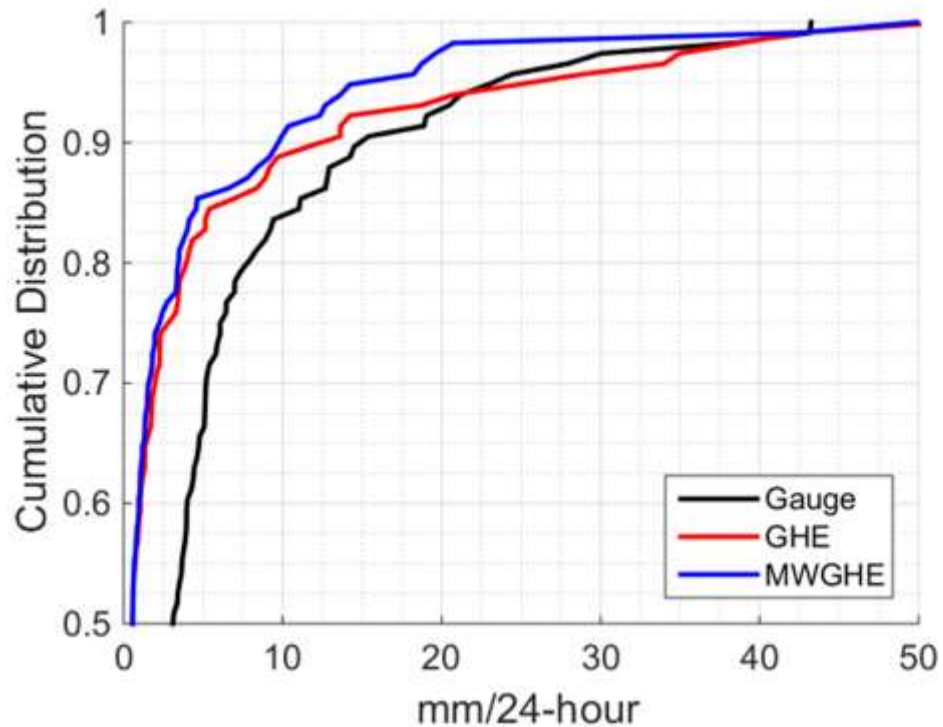
Data:

Six stations [indicated with red circles] with hourly rainfall that correspond with the Global hydro Estimator.

May 2012 – October 2015



Climatological Bias adjustment of Satellite rainfall estimates

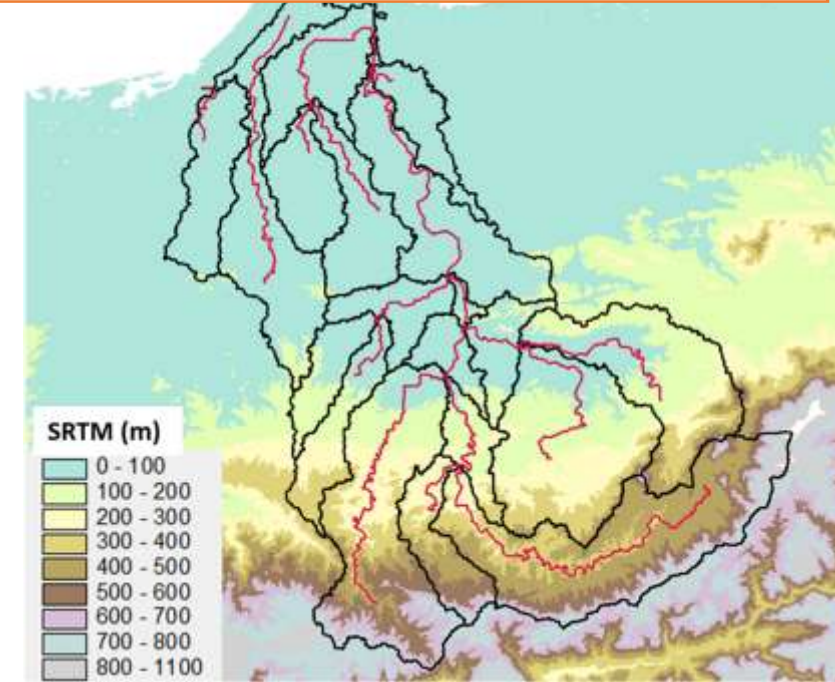


Months	Average (mm/day)			#Pairs	Bias Factors	
	Gauge	GHE	MWGHE		Gauge/ GHE	Gauge/ MWGHE
1	5.81	0.94	0.93	14.00		
2	6.38	5.19	2.43	28.00		
3	8.00	6.11	3.36	25.00		
4	2.68	4.61	4.26	12.00		
5	6.33	4.50	4.34	19.00		
Jan-May	29.20	21.34	15.33	98.00	1.37	1.9

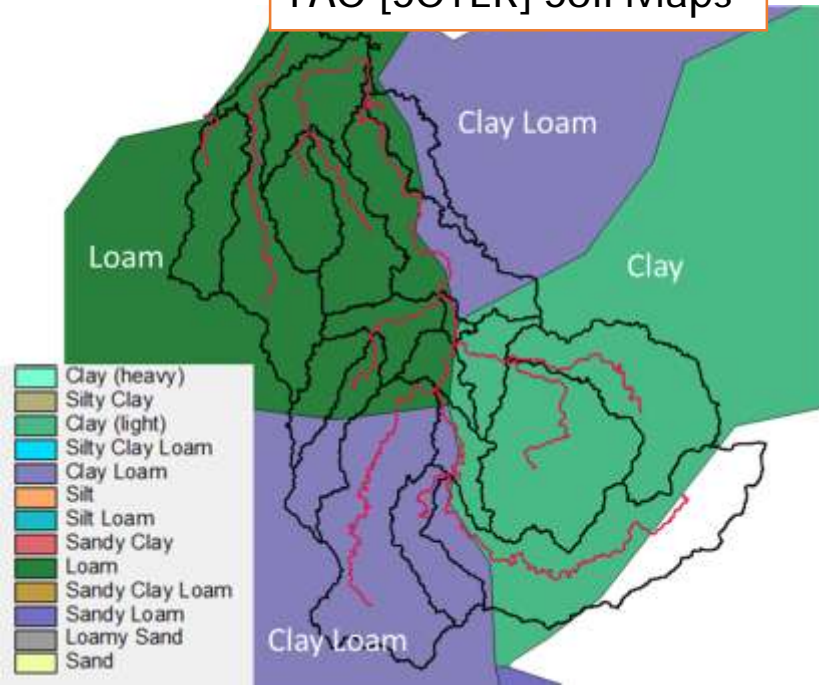
Hydrologic Model – Parameters

Sacramento Soil Moisture Accounting

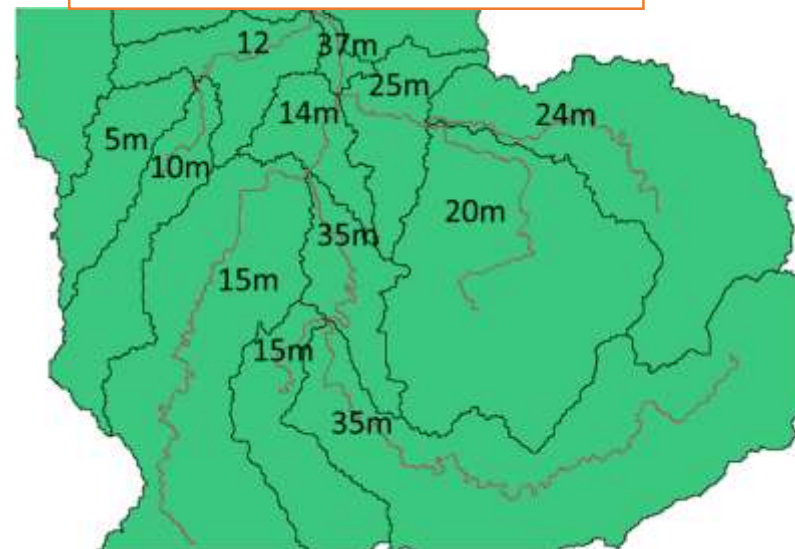
NASA's Shuttle Radar Topographic Mission
SRTM DEM 90m



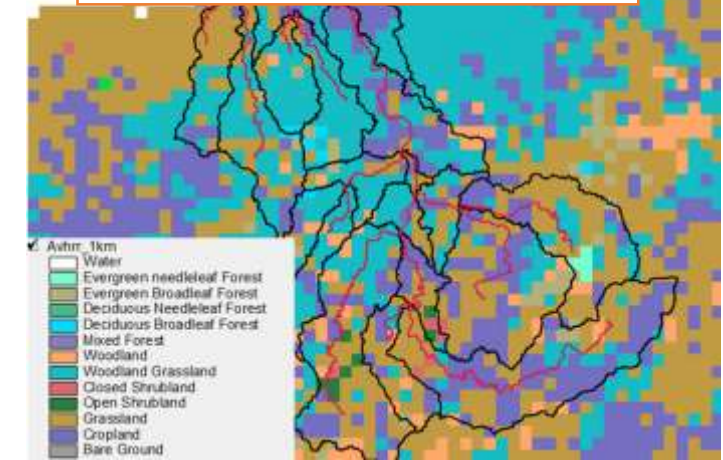
FAO [SOTER] Soil Maps



Google Earth Chanel Width

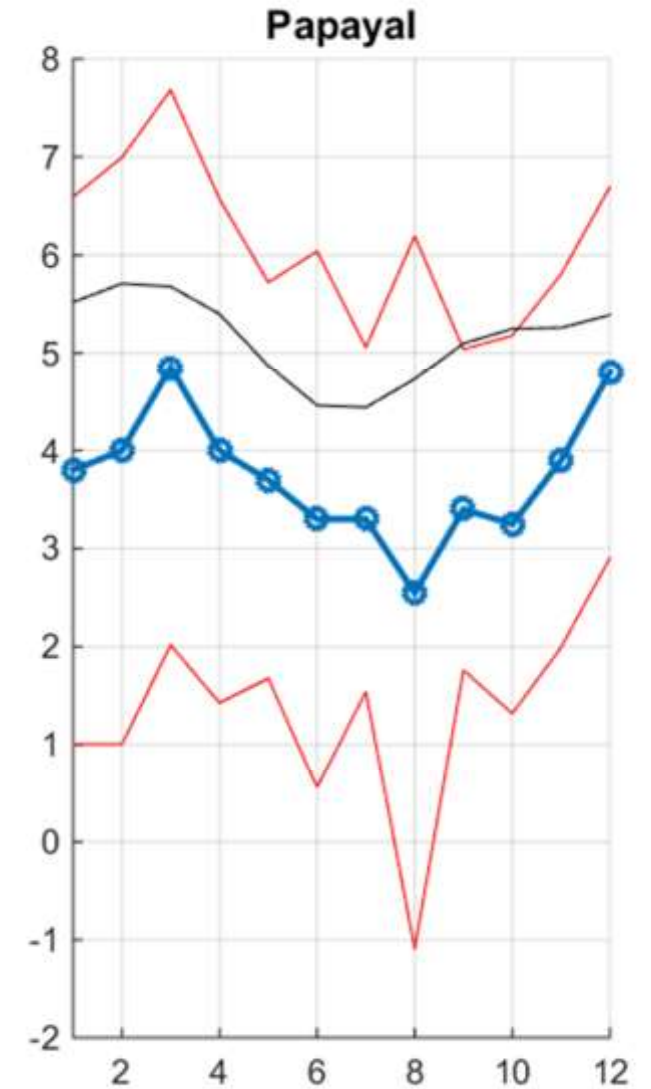
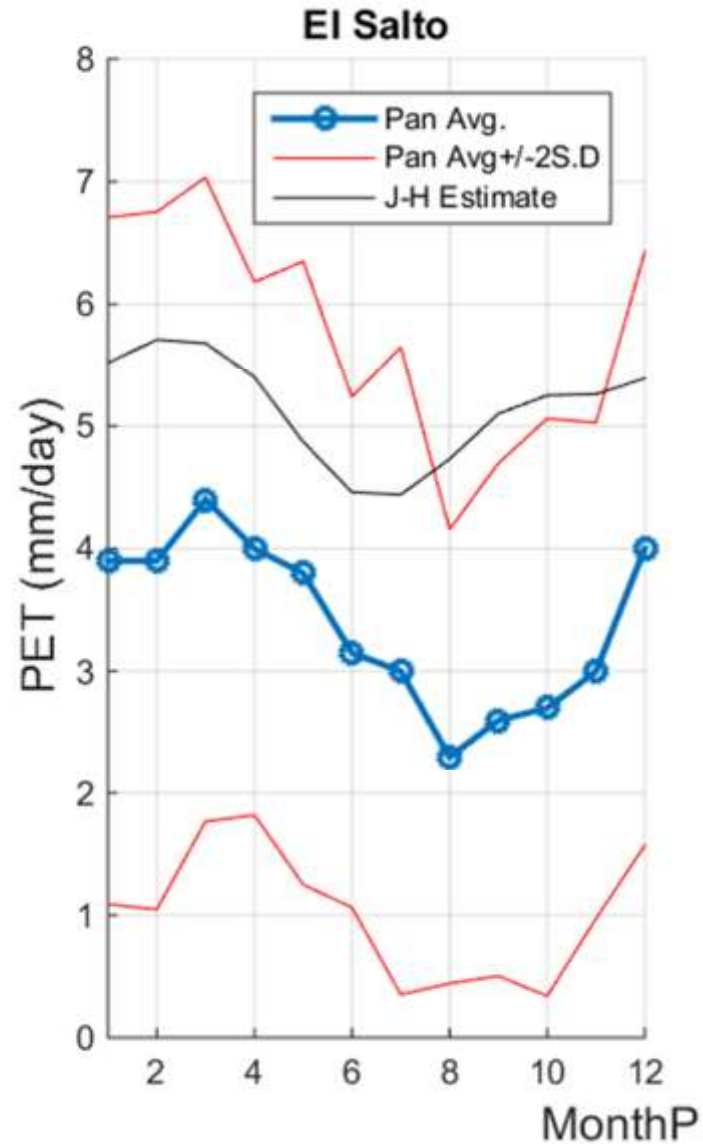


U.S Geological Survey
Land Use Land Cover 1-km



Potential Evapotranspiration

Pan evaporation record available
for 01/01/2010 -07/31/2014
Where used to calibrate the PET algorithm

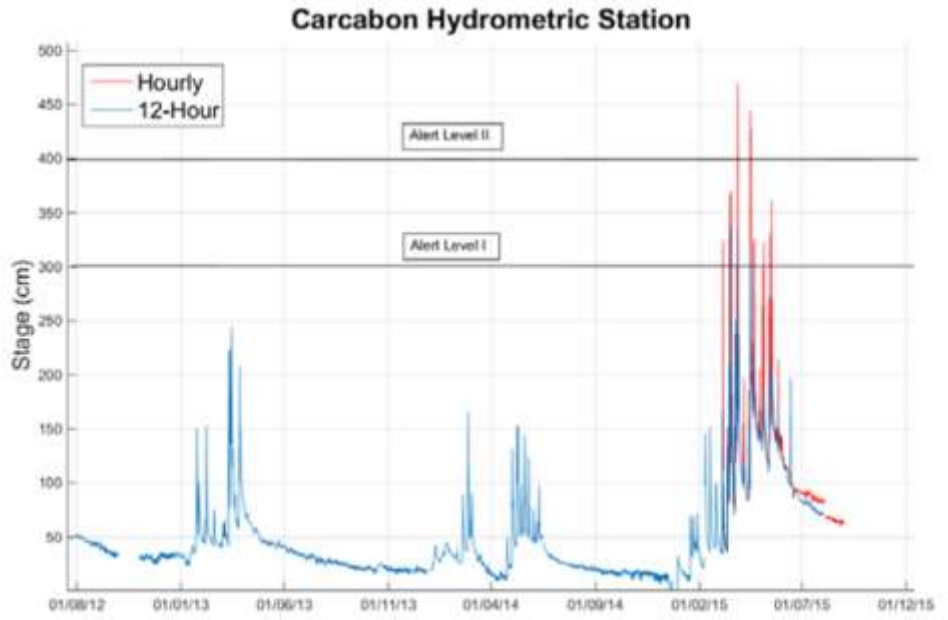


Evaluation: Retrospective Analysis

Carcabon Station ~800km²

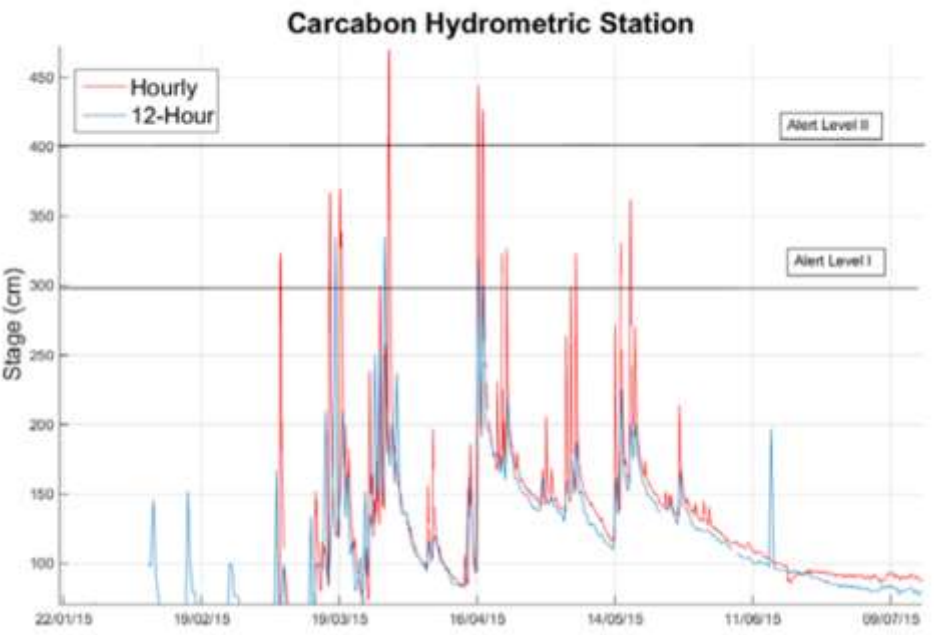
Data available 8/2012-9/2015

Only 2015 registered flow events above the Alert Levels



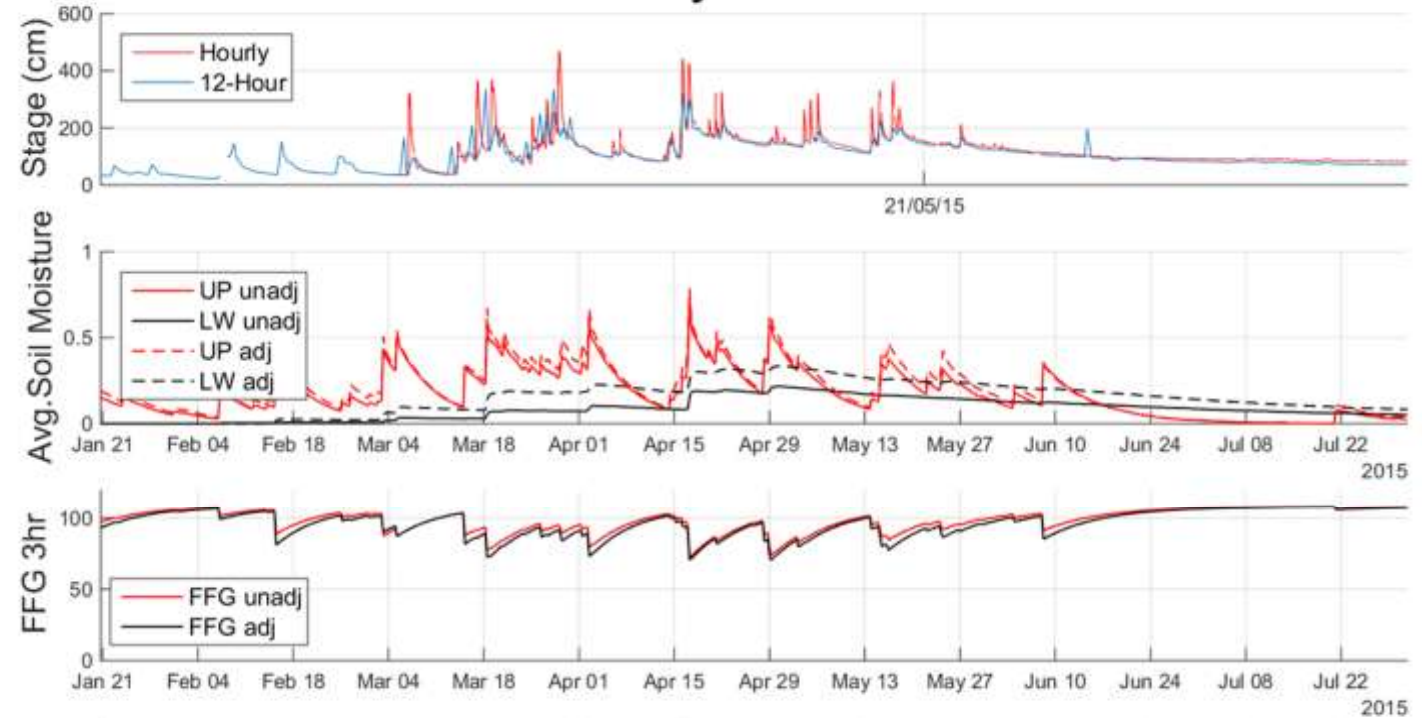
2012

2015

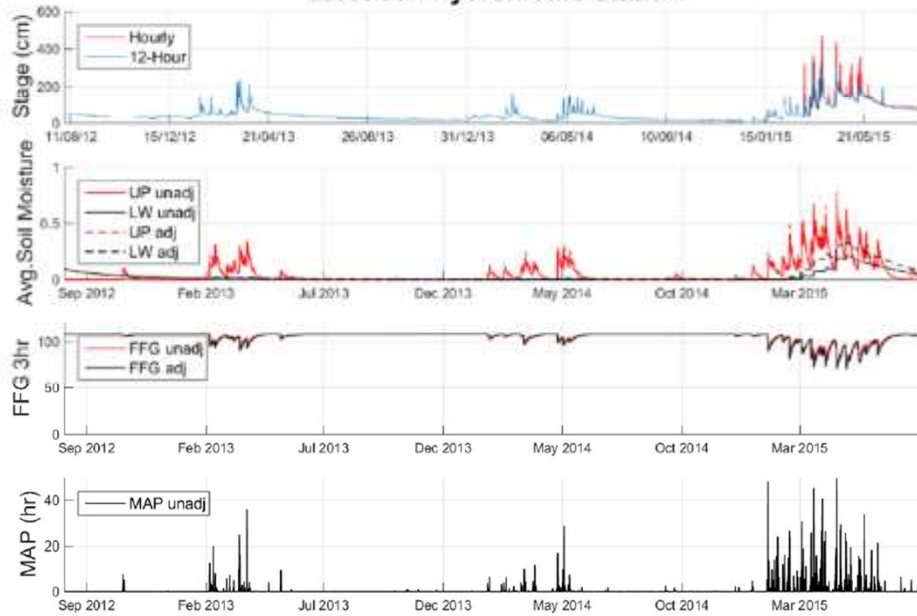


Hydrologic Model Simulations

Carcabon Hydrometric Station



Carcabon Hydrometric Station



Flash Flood Threats [Imminent]

