EARLY WARNING SISTEMS FOR FLOOD FORECASTING IN DURAZNO CITY IN URUGUAY

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BACKGROUND
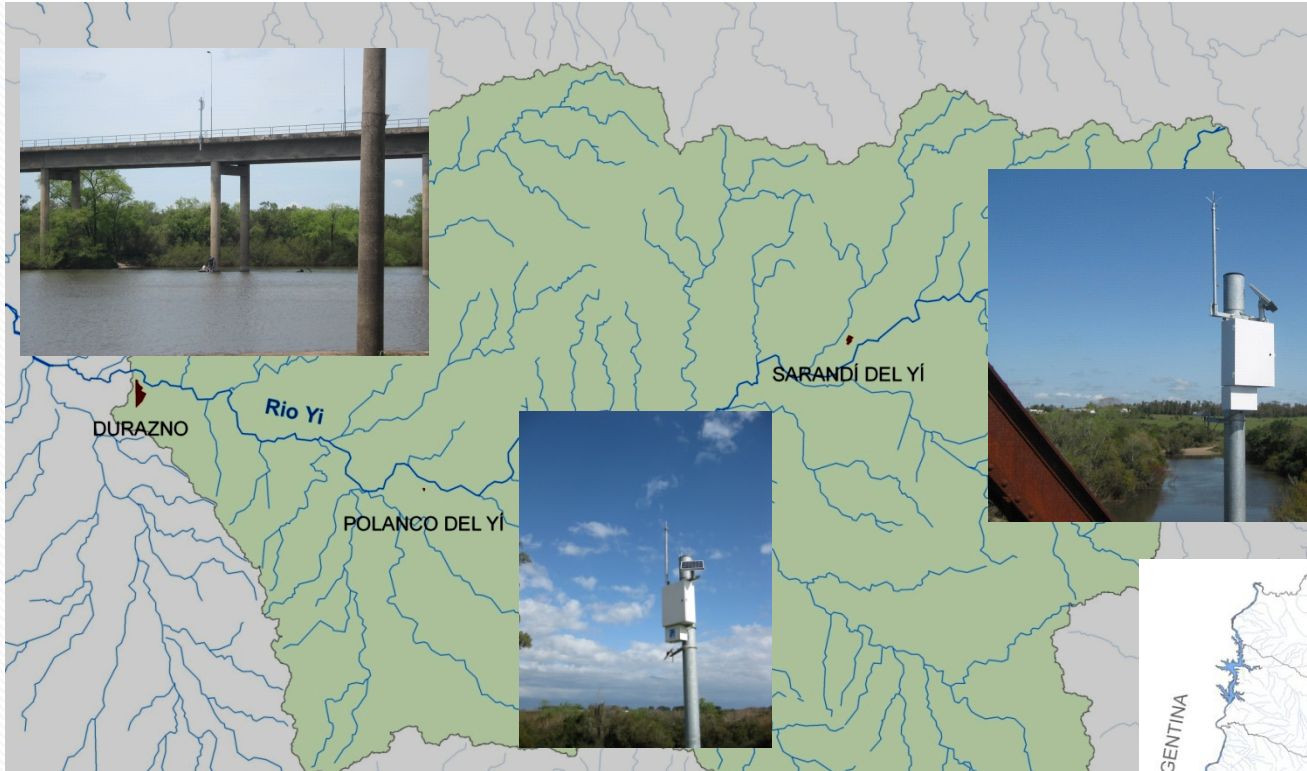
- **Population: 33.576 inhabitants**

- **Basin area: 8.750 km^2**

- **Tc = 54 hs**

BACKGROUND

Storms of May 2007 and February 2010:

5.500 a 6.000 inhabitants evacuated

(about 20% of the population)

COMPONENTS ofEWS-Durazno

INPUT DATA
ACQUISITION

HYDROLOGIC –
HYDRODINAMIC
MODELLING

SOCIAL
AND
LAND MANAGEMENT
MODEL

EWS-Durazno: Acquisition of Input Data

- **Rainfall:**

Weather Forecast:

WRF Model from Uruguay's Meteorological Board (INUMET), INMET/CPTEC (Brazil), IMFIA School of Engineering, etc.

Real Time measured rainfall:

Telemetric network UTE, Raingauges INUMET
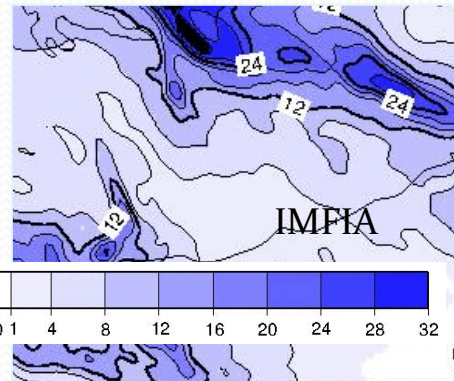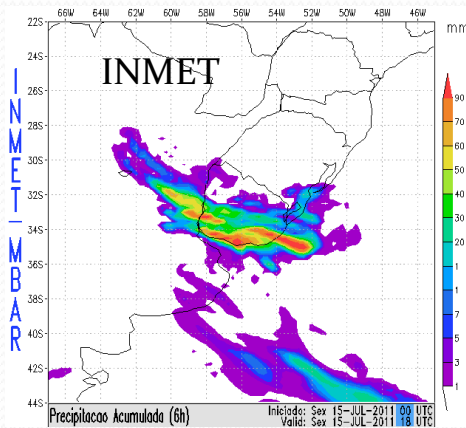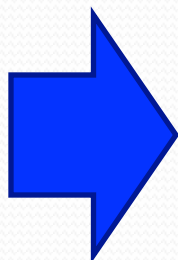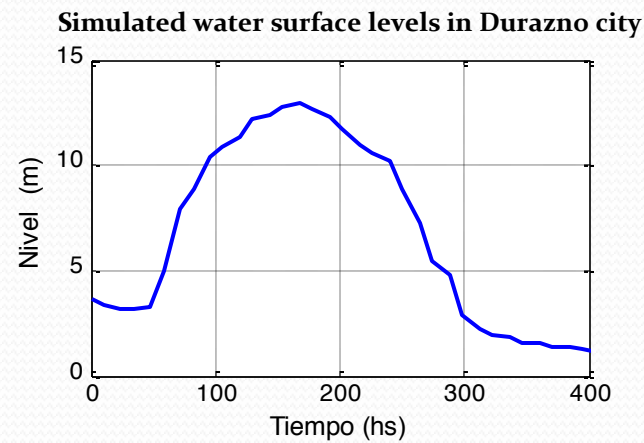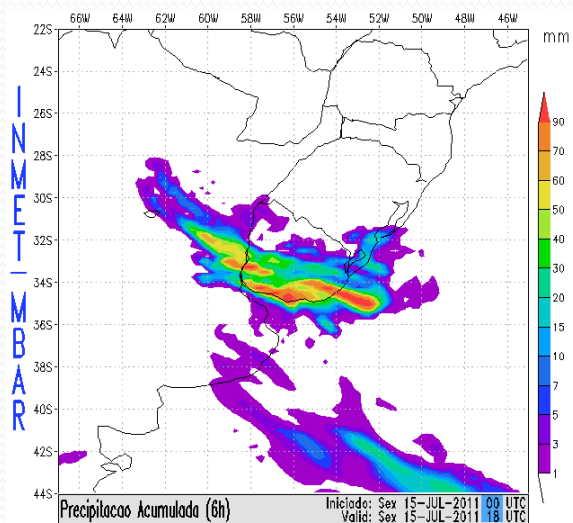

- **Wind**
  - Forecast (IMFIA)
  - Measurements (INUMET)

- **Basin data:**
  - Topography, soils, geology, land use.

EWS Durazno: Hydrologic-hydrodinamic model

Simulated water surface levels in Durazno city

EWS Durazno: Hydrologic-hydrodinamic model

The hydrologic-hydrodinamic model based on observed and predicted rainfall provides quantitative information about the future evolution of water surface levels to forecast flooded areas and its permanence in time.

1 A hydrologic model computes for each sub-basin the input flow hydrograph to Yi River. The input data is observed and forecasted rainfa''

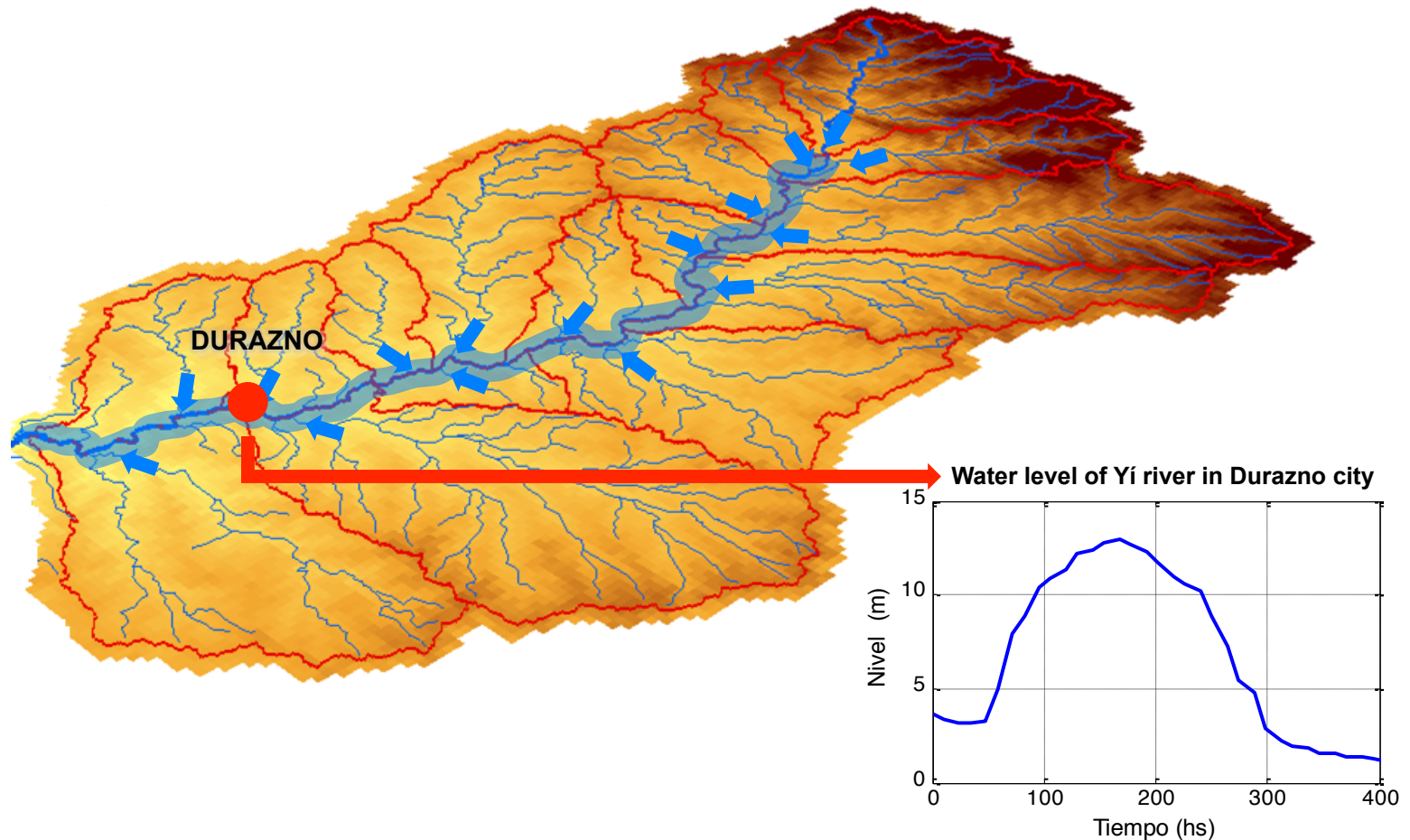Sub-basin input flow hydrograph
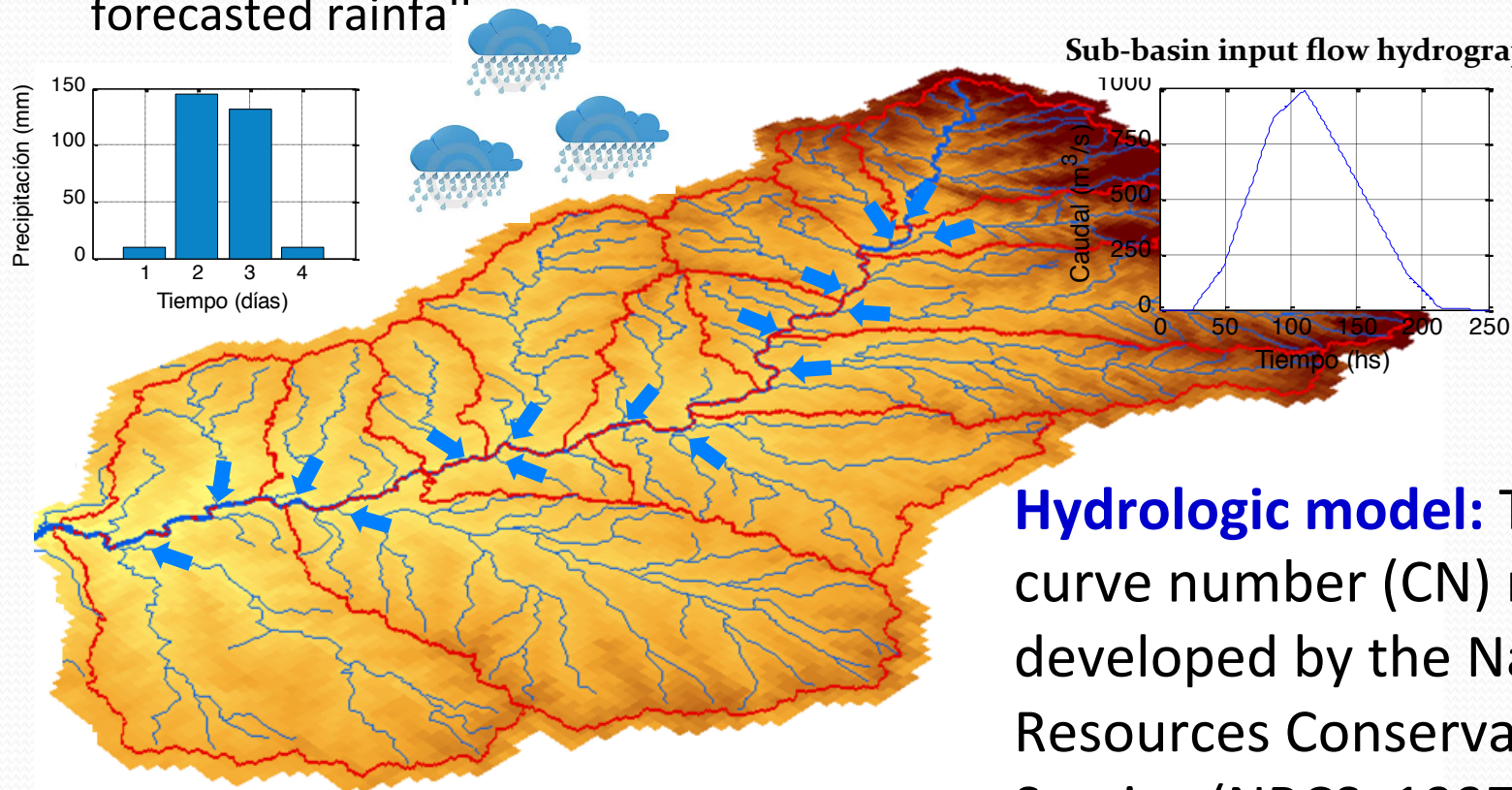
Hydrologic model: The curve number (CN) model developed by the Natural Resources Conservation Service (NRCS, 1997).

EWS Durazno: Hydrologic-hydrodinamic model

2 Simulation of the dynamics of water flow in motion to estimate the water level in Durazno city at each time step.

Water level of Yí river in Durazno city

EWS Durazno: Storm occurred in Jan-Feb 2014

DURAZNO

- **Monday 01/27/2014 Green level**
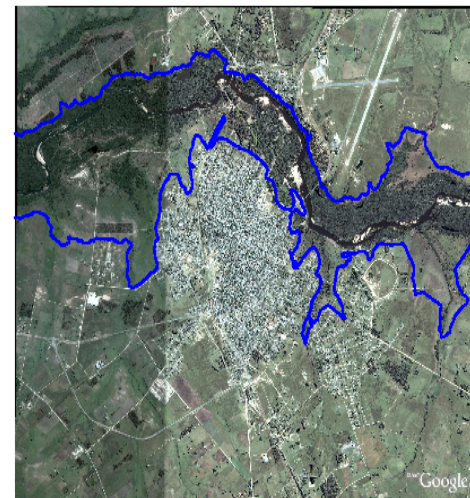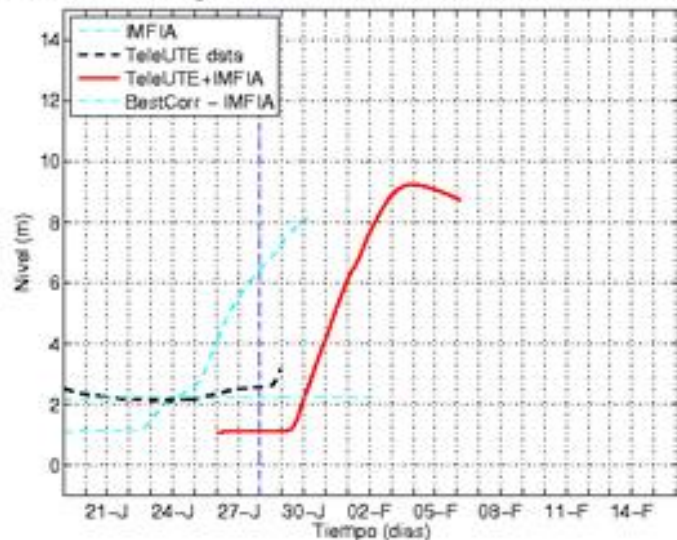- **Tuesday 01/28/2014 Yellow level**:
  Predicted peak (New bridge): 9.24 m.
  Predicted peak (Old bridge): 8.21 m.
  Expected dates for the predicted peak: 02/03 to 02/05/2014
  Recorded and forecasted rainfall: 127mm

EWS Durazno: Storm occurred in Jan-Feb 2014

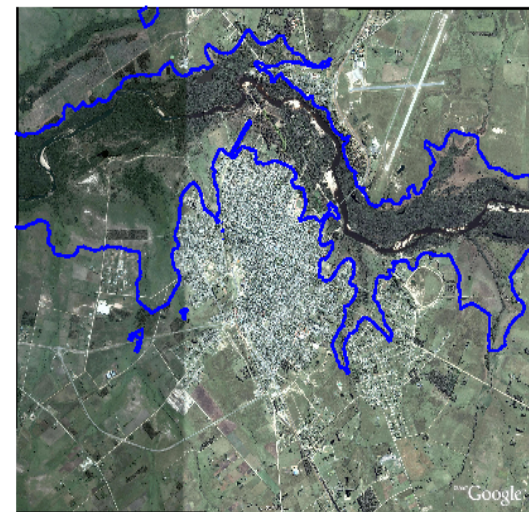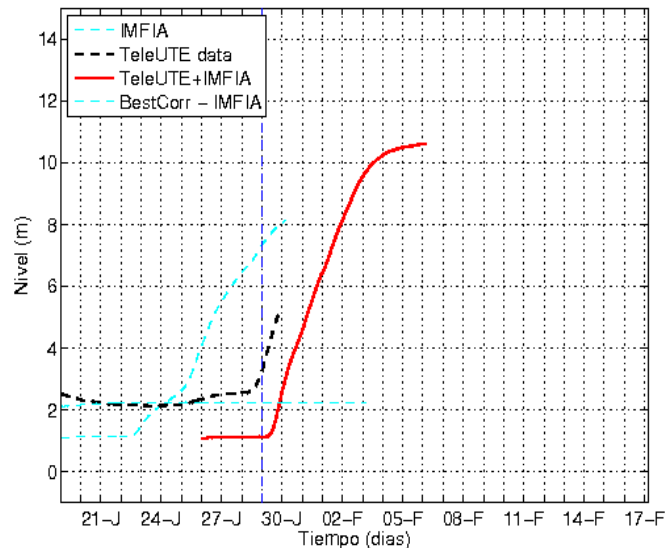**DURAZNO**

- **Wednesday 01/29/2014 Red level:**
  Predicted peak (New bridge): 10.61 m.
  Predicted peak (Old bridge): 9.48 m.
  Expected dates for the predicted peak: 02/05 to 02/07/2014
  Recorded and forecasted rainfall: 204mm

usando "Global" en /home/gusera/Prohimet–Yi/Durazno/Global/data/2014–01–29/ con refere

EWS Durazno: Storm occurred in Jan-Feb 2014

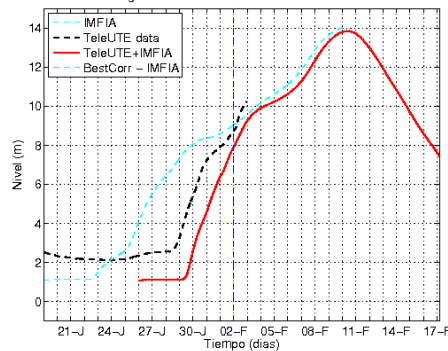- **DURAZNO, Sunday 02/02/2014 Red level:**

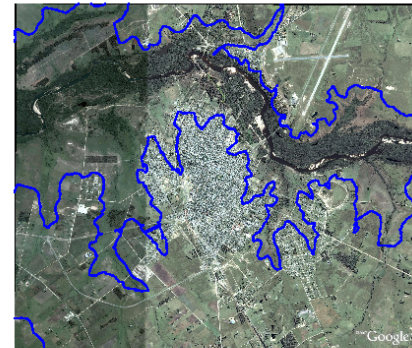 Predicted pek (New bridge): 13.85 m.
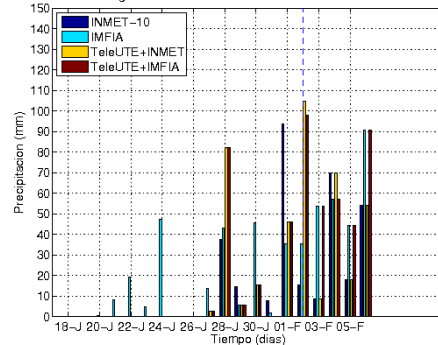
  Predicted peak (Old bridge): 12.51 m.

  Expected dates for the predicted peak: 02/09 to 02/11/2014

  Recorded and forecasted rainfall: 505mm

EWS Durazno: Storm occurred in Jan-Feb 2014

- **DURAZNO, Thursday 02/06/2014 Red level**
  Predicted peak (New bridge): 12.06 m.
  Predicted peak (Old bridge): 10.83 m.
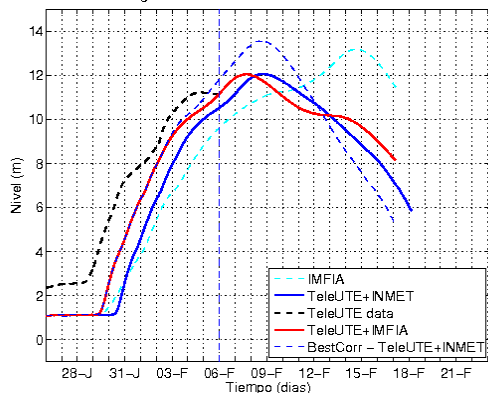 Expected dates for the predicted peak: 02/08 to 02/10/2014
  Recorded and forecasted rainfall: 366 mm

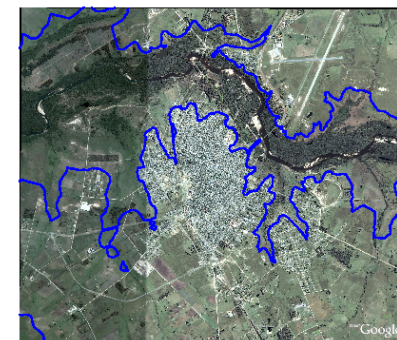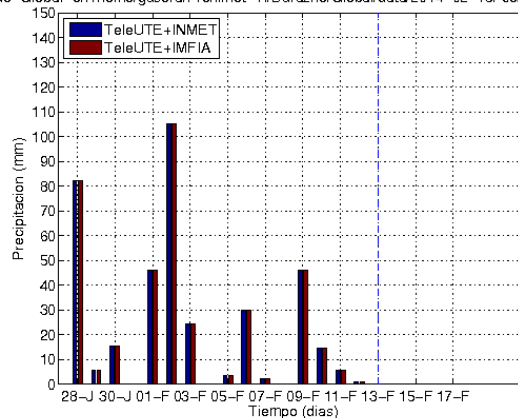 **Recorded maximum water level (New bridge): 11,23 m (-0,83 m)**
  Total recorded rainfall: 362 mm
  Evacuees: 2290 inhabitants

EWS Durazno: Storm occurred in Jan-Feb 2014

The EWS allowed to manage the storm that took place between 01/21 to 11/02/2014.

"Before there was chaos. People were evacuated without knowing which was the water level that would reach the river. People were evacuated 24 hours a day. Now we can manage the actions, using less trucks, with more time before the flood, more safely, "said Jesus Mario Rodríguez, director of the Durazno Emergency Coordinatation Center, The Observer 02/08/2014.

EWS Durazno: Real-time operation

1.- Statistical Model ("White Helmets" OAS).

2.- Combined Statistical Model and Hydrological model Sdel Yí.

3.- Hydrologic-Hydrodynamic model.

Sucess in the maximum value of H

Storm	1	2	3	Observed
24-25 May 2011	7,58 m	6,67-6,99 m	6,64 m	6,20 m
16-19 June 2011	8,46 m	6,43-6,95 m	6,42 m	6,74 m
15-16 July 2011	7,26 m	7,35-,53 m	8,30 m	8,62 m

Accuracy of the peak time

Storm	1	2	3	Observed
24-25 May 2011	---	---	28 May 5:00	27 May 13:00
16-19 June2011	---	---	21 June 18:00	21 June 18:00
15-16 July 2011	---	---	20 Jul y10:00	20 July10:00

THANK YOU!!