

# Training activities in Argentina

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National Weather Service

**Paola Salio**  
DCAO, University of Buenos Aires  
CIMA/CONICET

Challenges



# How does the learning process begin?



Scientific questions



Observing and measuring



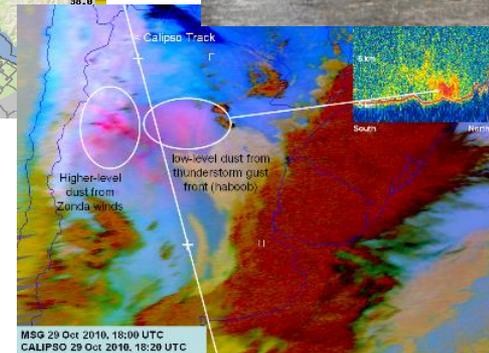
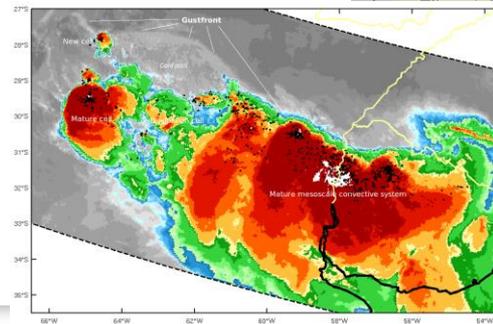
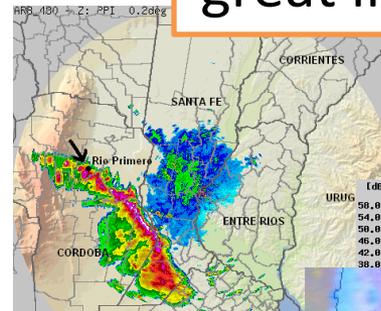
Understanding



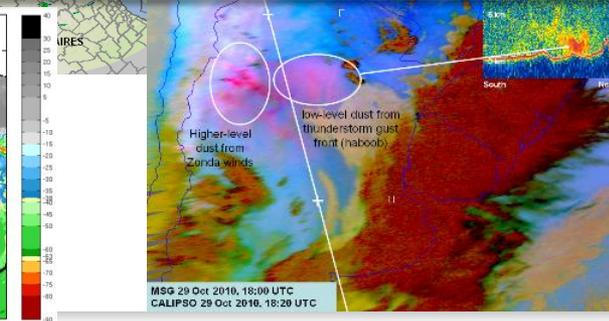
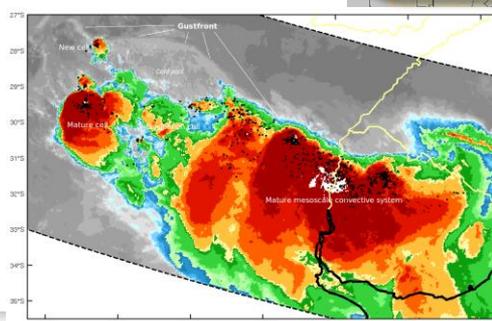
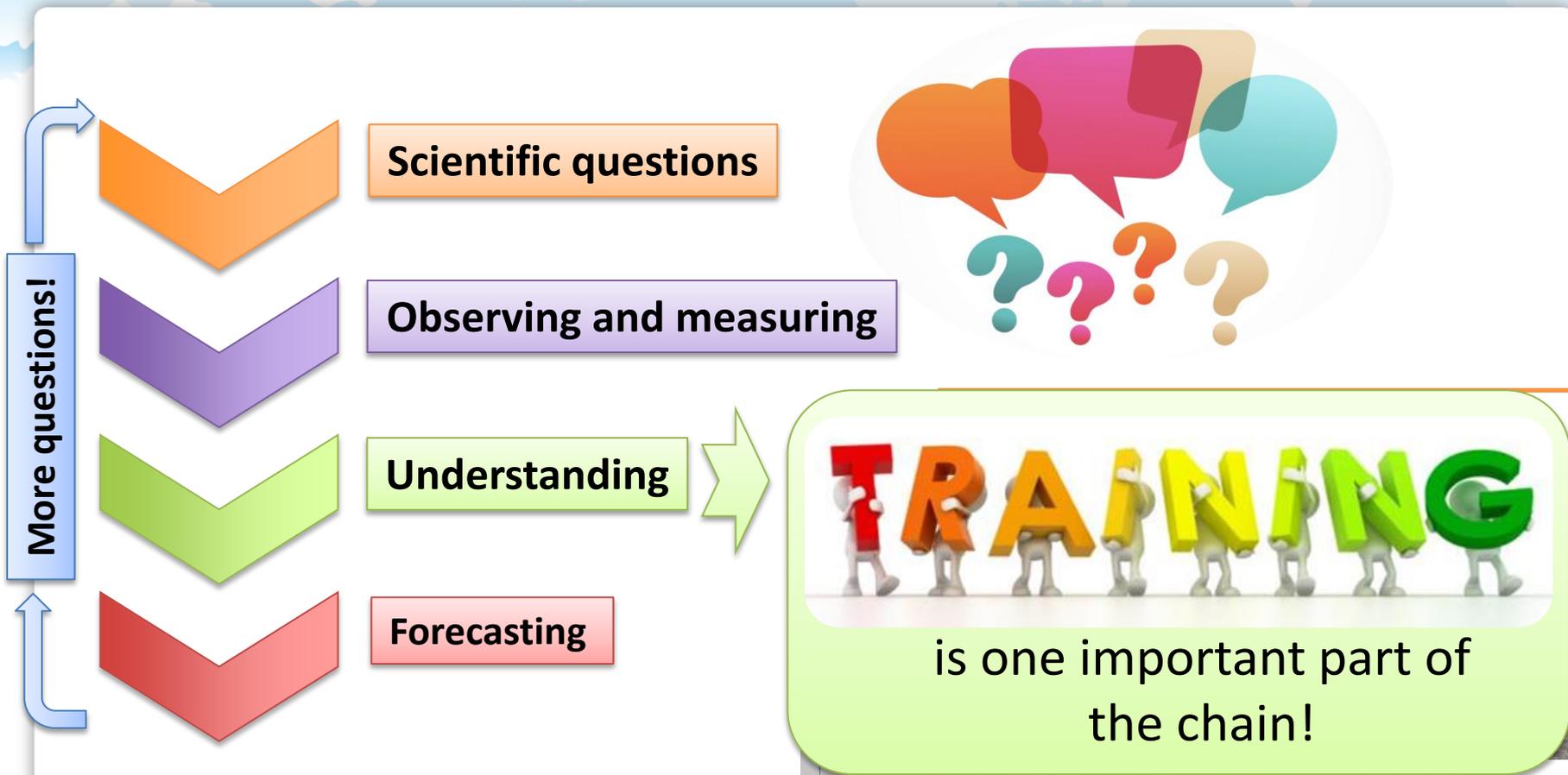
Forecasting



Severe weather has a great impact in Argentina!



# How does the learning process begin?



# South American Low Level Jet Experiment

(2002-2003)

Special rain gauge networks

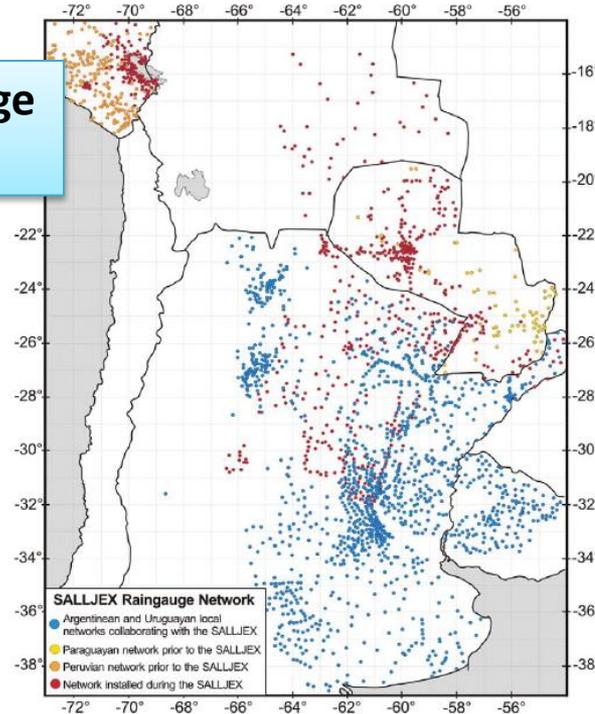
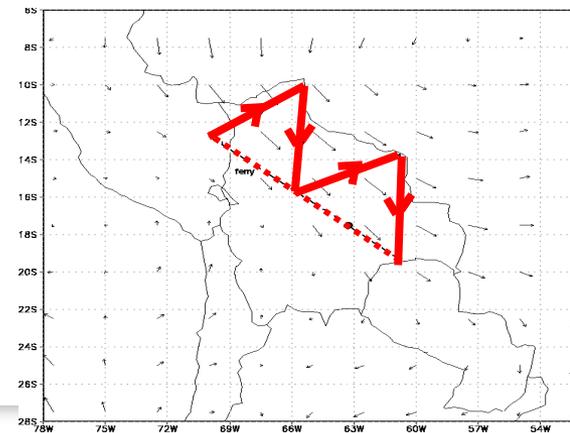


FIG. 4. SALLJEX rain gauge network



Dr. Celeste Saulo

Dr. Matilde Nicolini



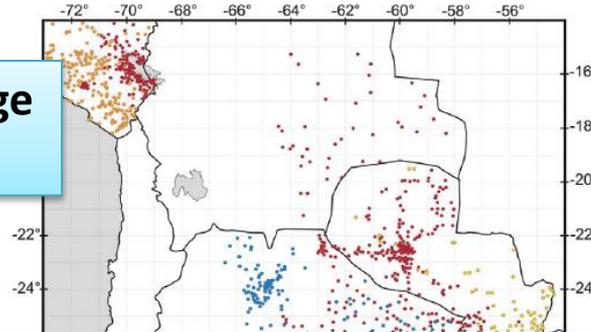
Dr. Paola Salio

Lots of observations!

# South American Low Level Jet Experiment

(2002-2003)

Special rain gauge networks



As an example of transference of research into training

What SALLJEX left?

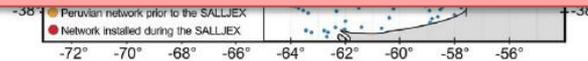
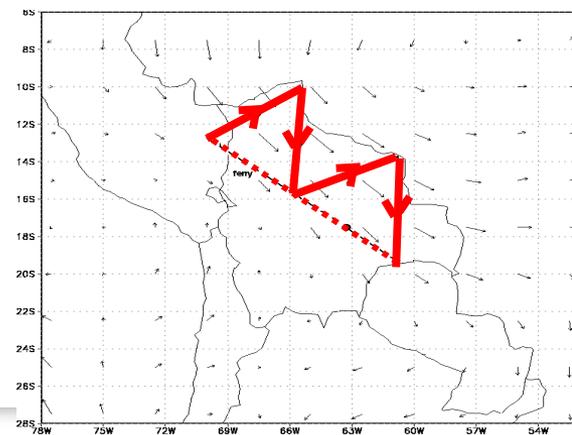


FIG. 4. SALLJEX rain gauge network



Dr. Matilde Nicolini

Dr. Celeste Saulo



Dr. Paola Salio

Lots of observations!

# What SALLJEX left?

Took few years ... for a complete **Conceptual Model for training**

VLab Project coordinated by Eumetsat



**Vesa  
Niestosvaara**



Conceptual Models for Southern Hemisphere

Search this site

- ARGENTINA
- SALLJ & MCSs
- ZONDA
- AUSTRALIA
- EXPLOSIVE
- CYCLOGENESIS
- SHALLOW COLD FRONTS
- BRAZIL
- ATLANTIC CONVERGENCE ZONE
- MESOSCALE CONVECTIVE COMPLEXES
- SOUTH AFRICA
- COL
- CONTINENTAL TROPICAL LOWS
- VIEW BY CATEGORY
- INVENTORY
- QUICK LOOK CASES
- LITERATURE
- CONTRIBUTORS

## Conceptual Models - the online collection

Conceptual Models for Southern Hemisphere is a joint project between four southern hemispheric Centres of Excellence: Argentina, Australia, Brazil and South Africa, reinforced by an expert group from Indonesia. The project is co-funded by WMO and EUMETSAT.

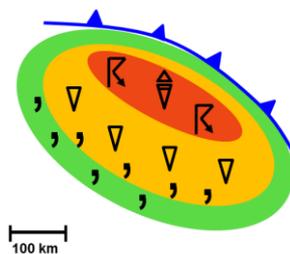
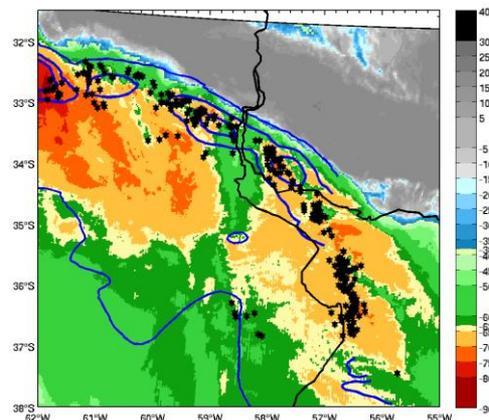
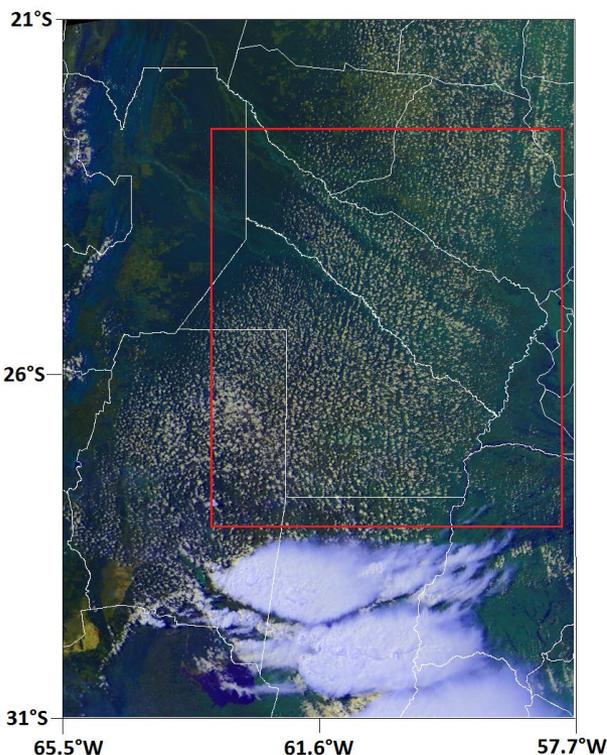
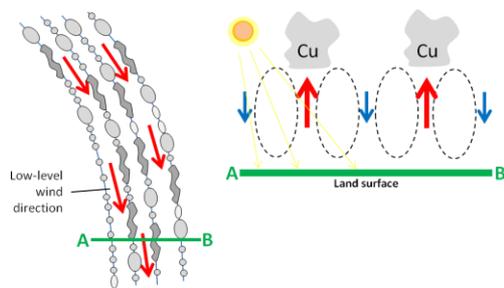
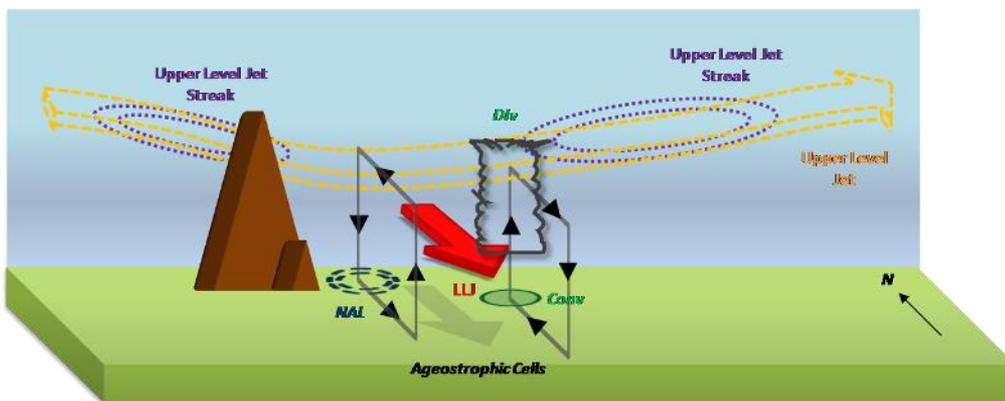
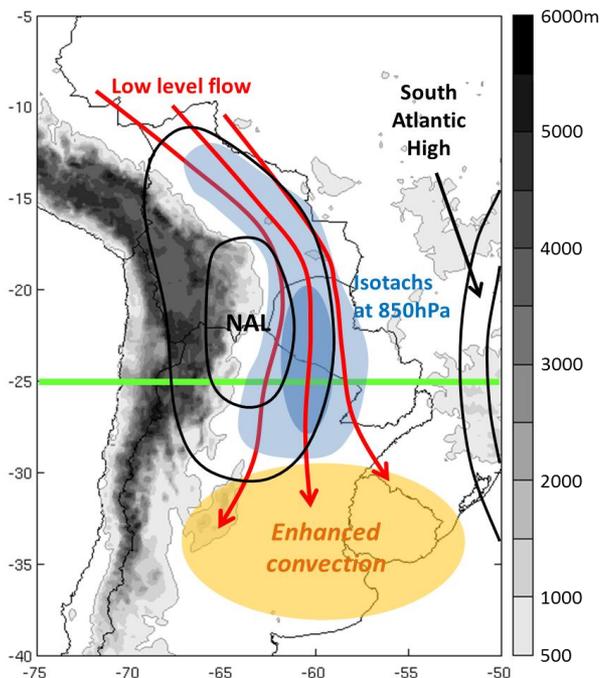
The purpose of the project is to improve warnings and awareness of weather risks through the use of conceptual models.



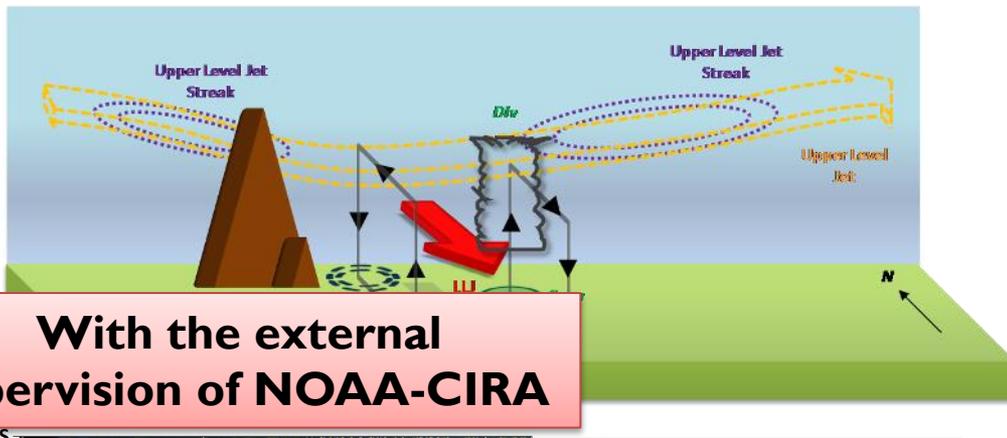
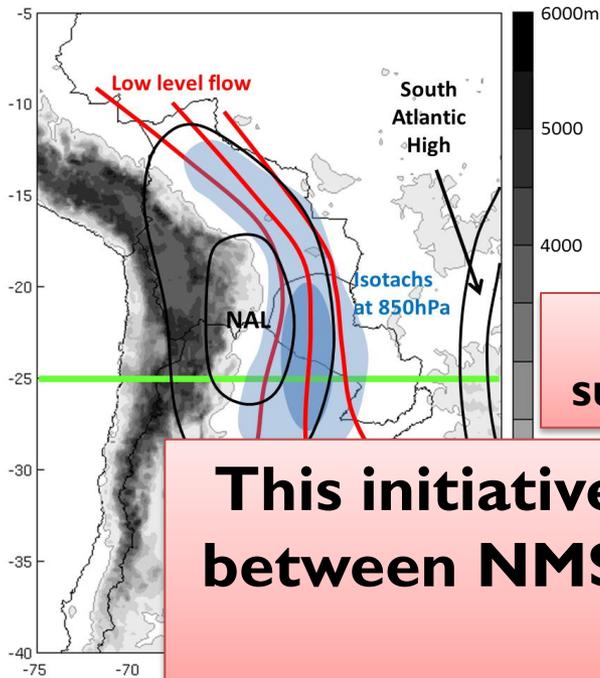
**Claudia Competella,  
Luciano Vidal, Silvina  
Righetti, Ma. Ines  
Campos, Federico  
Otero, Hernán Bechis**

<https://sites.google.com/site/cmsforsh/>

# SALLJ Conceptual Model

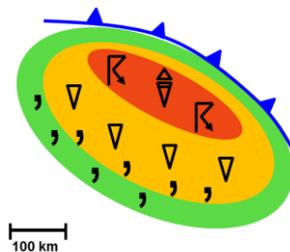
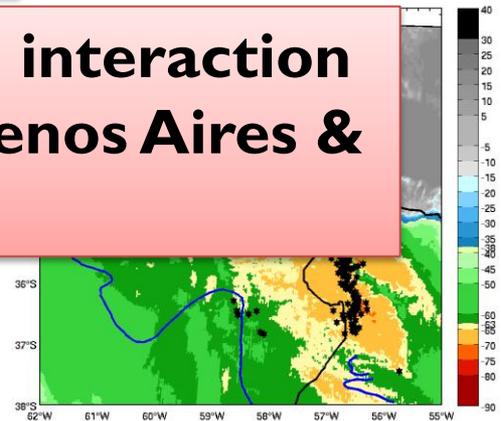
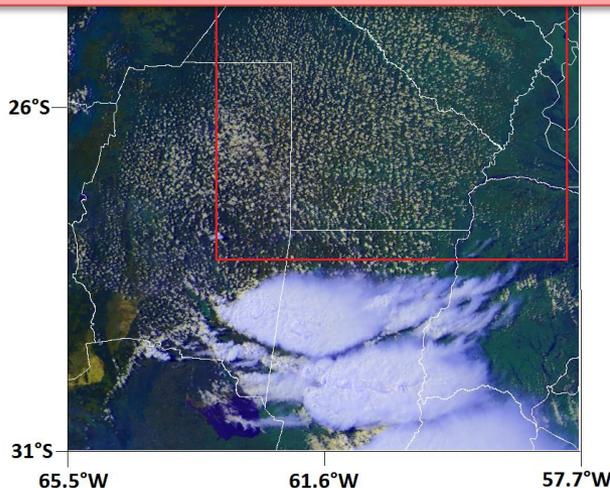
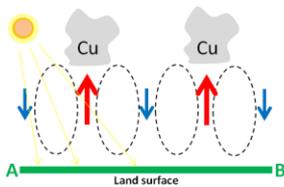
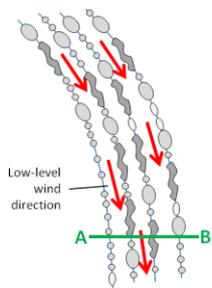


# SALLJ Conceptual Model



With the external supervision of NOAA-CIRA

This initiative reinforced regional interaction between NMS & University of Buenos Aires & CoE Brazil

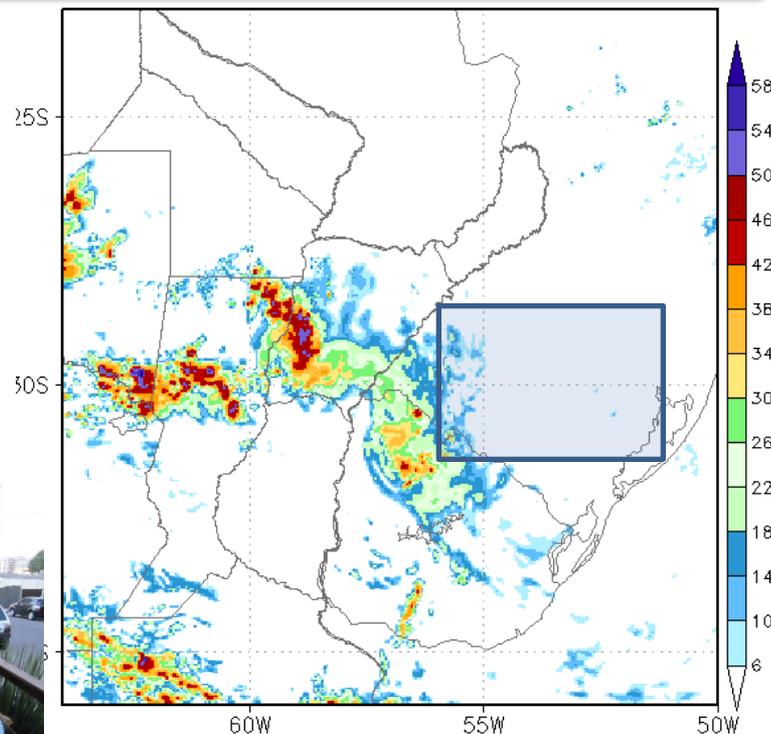


# Brazilian CHUVA-SUL Experiment

## November 2012



### NWS-WRF 4-km reflectivity output



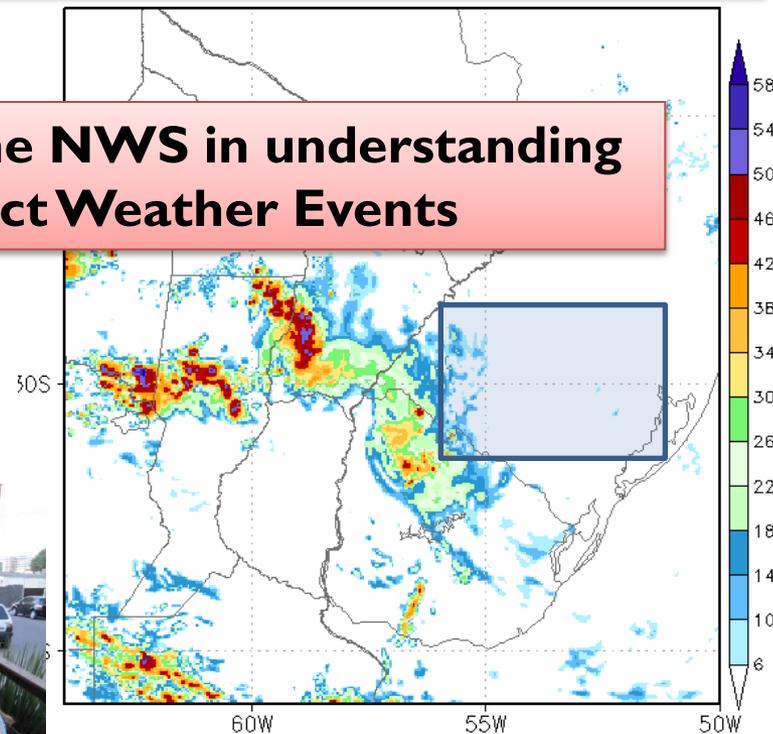
# Brazilian CHUVA-SUL Experiment

## November 2012



NMS-WRF 4-km reflectivity output

It revealed a new challenge for the NWS in understanding and forecasting High Impact Weather Events



# What CHUVA Experiment left?



## Training Workshop on NOWCASTING TECHNIQUES



### Training Workshop on Nowcasting Techniques: T-NOTE Buenos Aires, August 5-16, 2013

#### Invited Instructors and Talks

*Paul Joe* - Environment Canada

*Rita Roberts* – NCAR, USA

*James Wilson* – NCAR, USA

*Isztar Zawadzki* – McGill University, Canada

*Carlos Morales* - University of Sao Paulo, Brazil

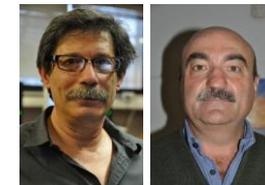
*Estelle de Coning* - South African Weather Service

*José García-Moya Zapata* - AEM- Spain

*Steven Goodman* - NASA, NOAA

*Jenny Sun* – NCAR – USA

*Gustavo Cabrera* – INVAP S.E.



#### Argentine Instructors:

*Celeste Saulo* – UBA/CIMA

*Paola Salio* – UBA/CIMA

*Juan Ruiz* - UBA/CIMA

*Claudia Campetella* – SMN /UBA



# What CHUVA Experiment left?



## Training Workshop on NOWCASTING TECHNIQUES



### Trainning Workshop on Nowcasting Techniques: T-NOTE Buenos Aires, August 5-16, 2013



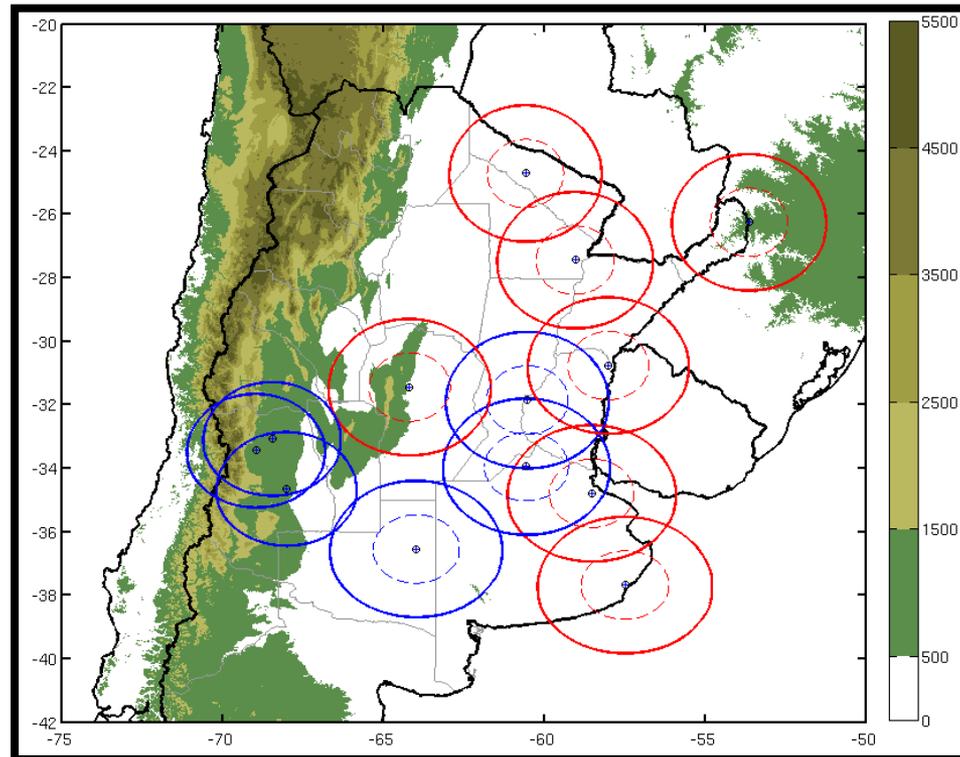
#### It helped

- ✓ building local capacity, to enhance a critical mass of trainers
- ✓ interaction with potential users of nowcasting

# T-NOTE legacy in Argentina

**SINARAME**

**Expand the actual radar network in Argentina**



**Actual**

**SINARAME**

Agreement with INVAP S.E is signed for 10 additional C-Band dual pol radars



# T-NOTE legacy in Argentina

## ALERT.AR

("alertar" means warning in spanish)

**RELAMPAGO:**  
Experimental  
phase to test all  
components of  
the system on  
IOPs and dense  
observation  
network

Remote Sensing  
Data Quality

Nowcasting  
Tools

Generation of a hazard  
weather testbeds

T-PEMAI

Operational  
NWP system  
including  
radar data  
assimilation

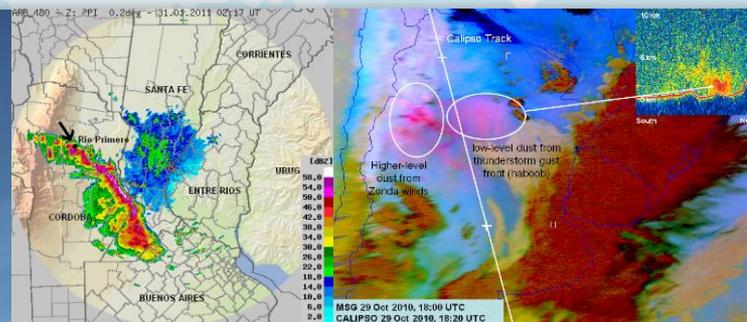
# RELAMPAGO



# RELAMPAGO

Remote sensing of Electrification, Lightning, And Meso-scale/micro-scale Processes with Adaptive Ground Observations  
(translates to “lightning flash” in Spanish and Portuguese)

Stephen Nesbitt, Univ. of Illinois  
Paola Salio, Univ. of Buenos Aires



# RELAMPAGO

It is a RDP recommended by the WMO Nowcasting and Mesoscale Numerical Modeling Group



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Port

Stephen  
Paola Salio, Univ. of Buenos Aires



## June 2013. International Endorsement by the WMO-WWRP JSC Programme

**World Weather Research Programme**



WWRP advances society's ability to cope with high impact weather through research focused on improving the accuracy, lead time and utilization of weather prediction. The WWRP includes working groups, experts teams and the THORPEX programme.

High Impact Weather

Mesoscale Forecasting

Nowcasting

Polar Prediction Project

Sand & Dust Storms

THORPEX

Subseasonal to Seasonal Prediction Project

Tropical Meteorology

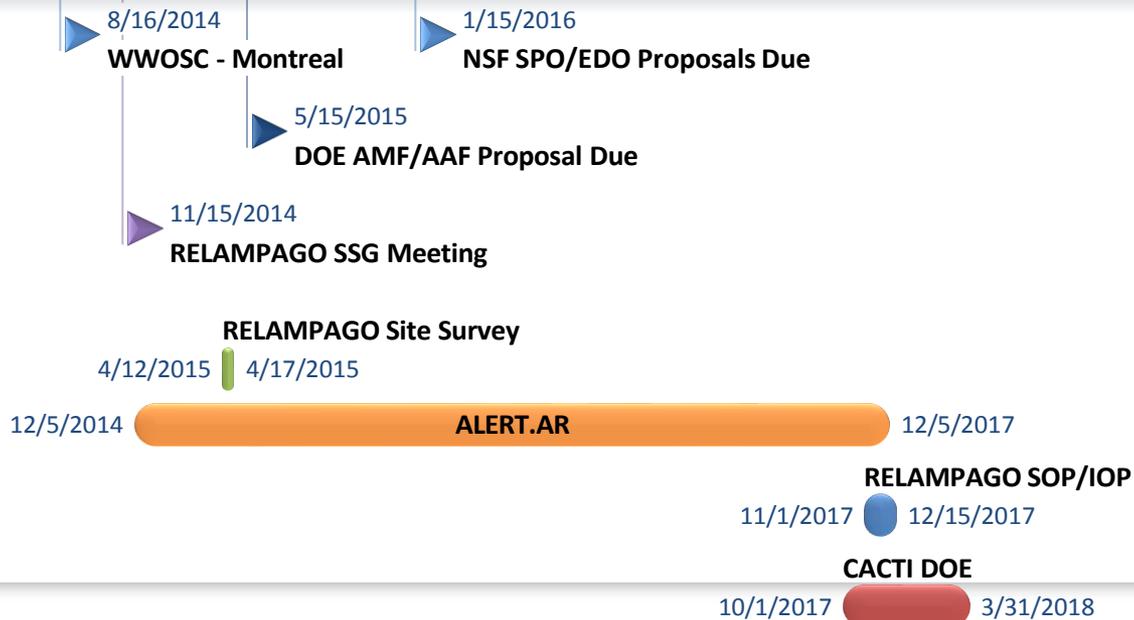
Verification

Weather Modification

Weather & Society



2018



10/6/2013

# June 2013. International Endorsement

by the WMO-WWRP ISC Programme

10/8/2013

**August 2014. Presentation during Nowcasting working group sessions before the WWRP-Open Science Conference in Canada**



4/16/2015



2018



8/16/2014

WWOSC - Montreal

1/15/2016

NSF SPO/EDO Proposals Due

5/15/2015

DOE AMF/AAF Proposal Due

11/15/2014

RELAMPAGO SSG Meeting

RELAMPAGO Site Survey

4/12/2015

4/17/2015

12/5/2014

ALERT.AR

12/5/2017

RELAMPAGO SOP/IOP

11/1/2017

12/15/2017

CACTI DOE

10/1/2017

3/31/2018

**RELAMPAGO NASA GPM Ground Validation**

10/6/2013



**Servicio Meteorológico Nacional**

**Relampago Meeting Paris - France**

10/8/2013

**RELAMPAGO Workshop - NCAR**

10/9/2014

**AMS SLS Meeting - Madison**

11/3/2014

**AGU RELAMPAGO SSG Meeting**

12/15/2014

**Relampago Talk Mendoza**

4/13/2015

**Relampago Talk Cordoba**

4/16/2015

2013

2014

2015

2016

2017

2018

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**ALERT.AR**

12/5/2017

**RELAMPAGO SOP/IOP**

11/1/2017

12/15/2017

**CACTI DOE**

10/1/2017

3/31/2018

# RELAMPAGO Potential Contributions

## NSF (US)

*Deployment pool*  
S-PolKa  
DOWs  
ISS +  
Expendables  
Mesonet/sticknet  
(CSWR)  
DIAL LIDAR

*Non-deployment  
pool*  
Hydromet  
measurements  
(RAL)  
GPS water  
vapor sensors

## DOE (US)

AMF-1  
(cloud/profiling  
suite, aerosol  
measurements)  
G-I microphysical  
and aerosol  
aircraft)

## NOAA (US)

Lightning  
mapping array  
Field mills  
NOAA P-3

## NASA (US)

Disdrometers  
Rain gauges  
Micro-rain  
radars

## NASA + NOAA (US)

Pre-ACE +  
Severe Weather  
+ GLM validation  
NASA ER-2

## SMN (AR)

C-Band DP op  
network

Mobile  
soundings

Enhancement of  
operational  
radiosondes

DSD + rainfall

## INPE (BR)

Mobile X-Band  
DP radar  
Precip/profiling  
supersite  
Lightning  
mapping array  
Sticknet  
S-Band DP  
radars  
downstream

# ALERT.AR

(“alertar” means warning in spanish)

**RELAMPAGO:**  
Experimental  
phase to test all  
components of  
the system on  
IOPs and dense  
observation  
network

Remote Sensing  
Data Quality

Nowcasting  
Tools

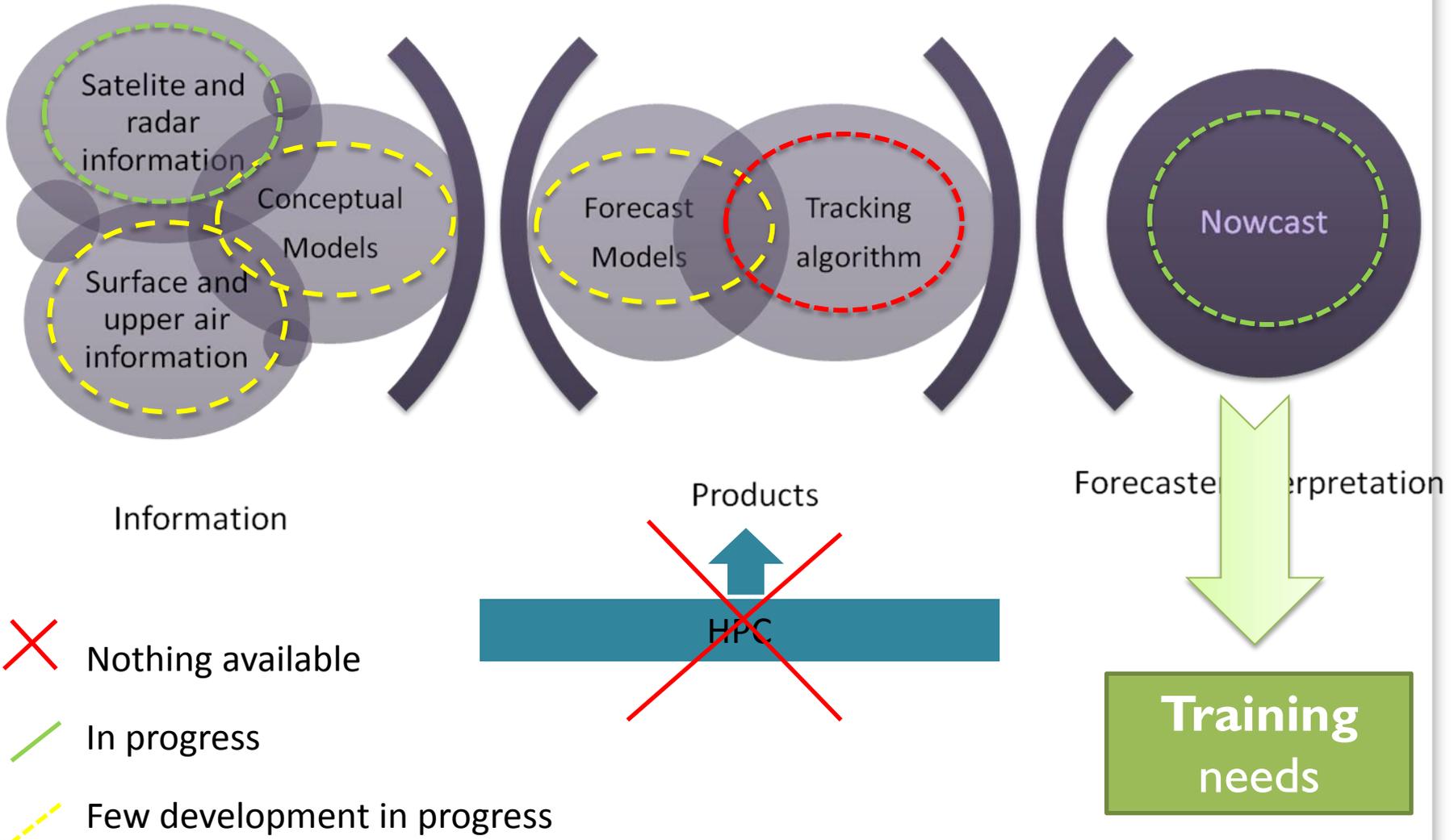
Generation of a hazard  
weather testbeds

T-PEMAI

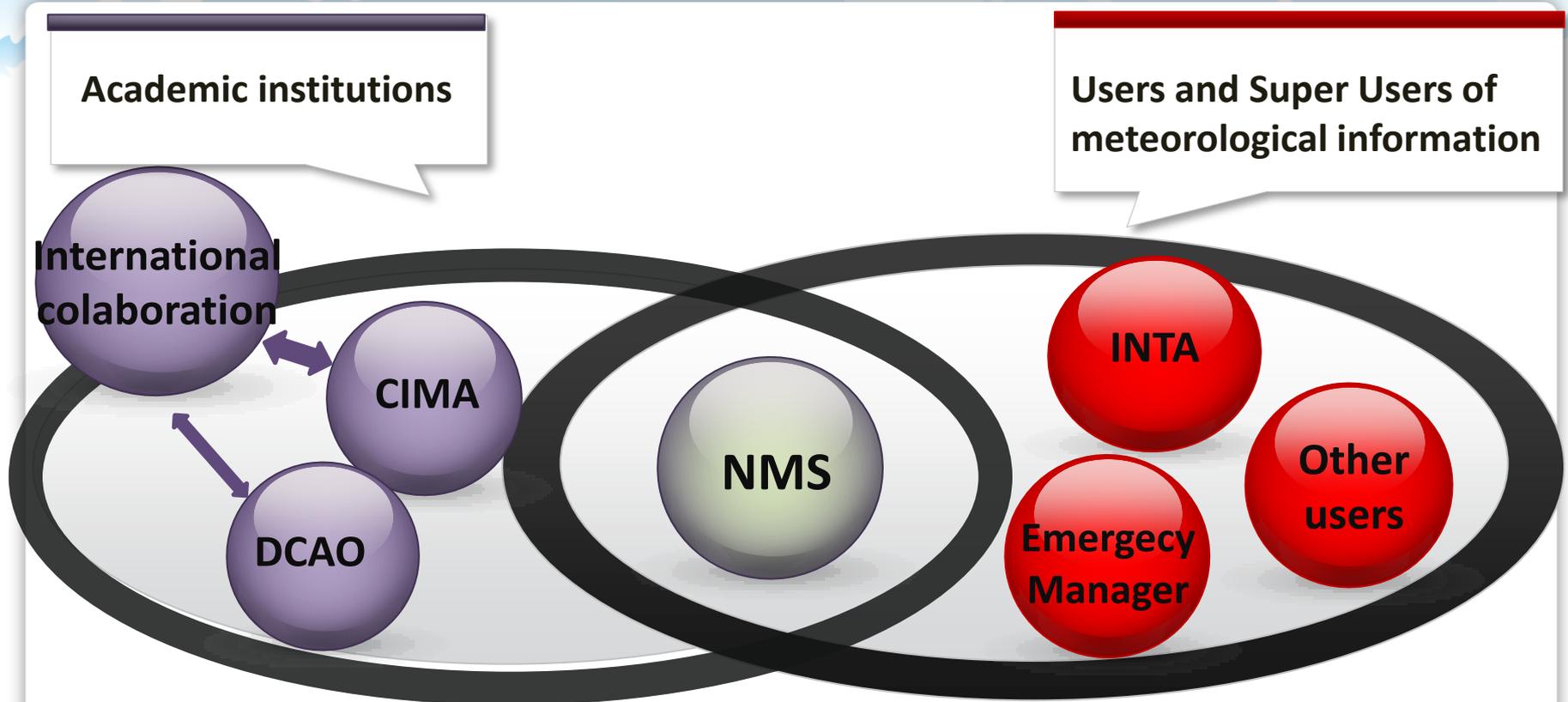
Operational  
NWP system  
including  
radar data  
assimilation

Still...

# What we have and have not in ARGENTINA?



# ALERT.AR Members



is focused on improve tools, to understand the best way to communicate the information to super users, users and society.

**How do we achieve this?**

# T-PEMAI

First testbed in December 2014  
at the NMS



**Collaborators:**

**Paola Salio**

**Yanina Garcia Skabar**

**Luciano Vidal**

**Cynthia Matsudo**

**Juan Ruiz**

**Federico Robledo, Elodie Broche**

**Soledad Cardazzo, Matias Armanini,**

**Mauricio Gatto**

First testbed in December 2014  
at the NMS



- **Inspired by Oklahoma HWTBs**



- **Capacity building activities for South America**



- **Interaction between developers, researchers, forecasters, with emergency managers in order to help to develop emergency on HIW events**

Collaborators:

Paola Salio

Yanina Garcia Ska

Luciano Vidal

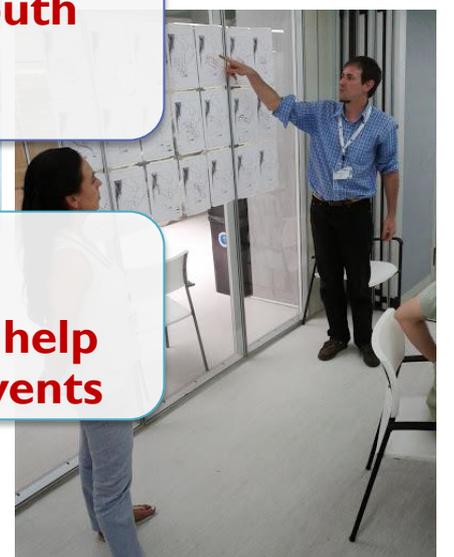
Cynthia Matsudo

Juan Ruiz

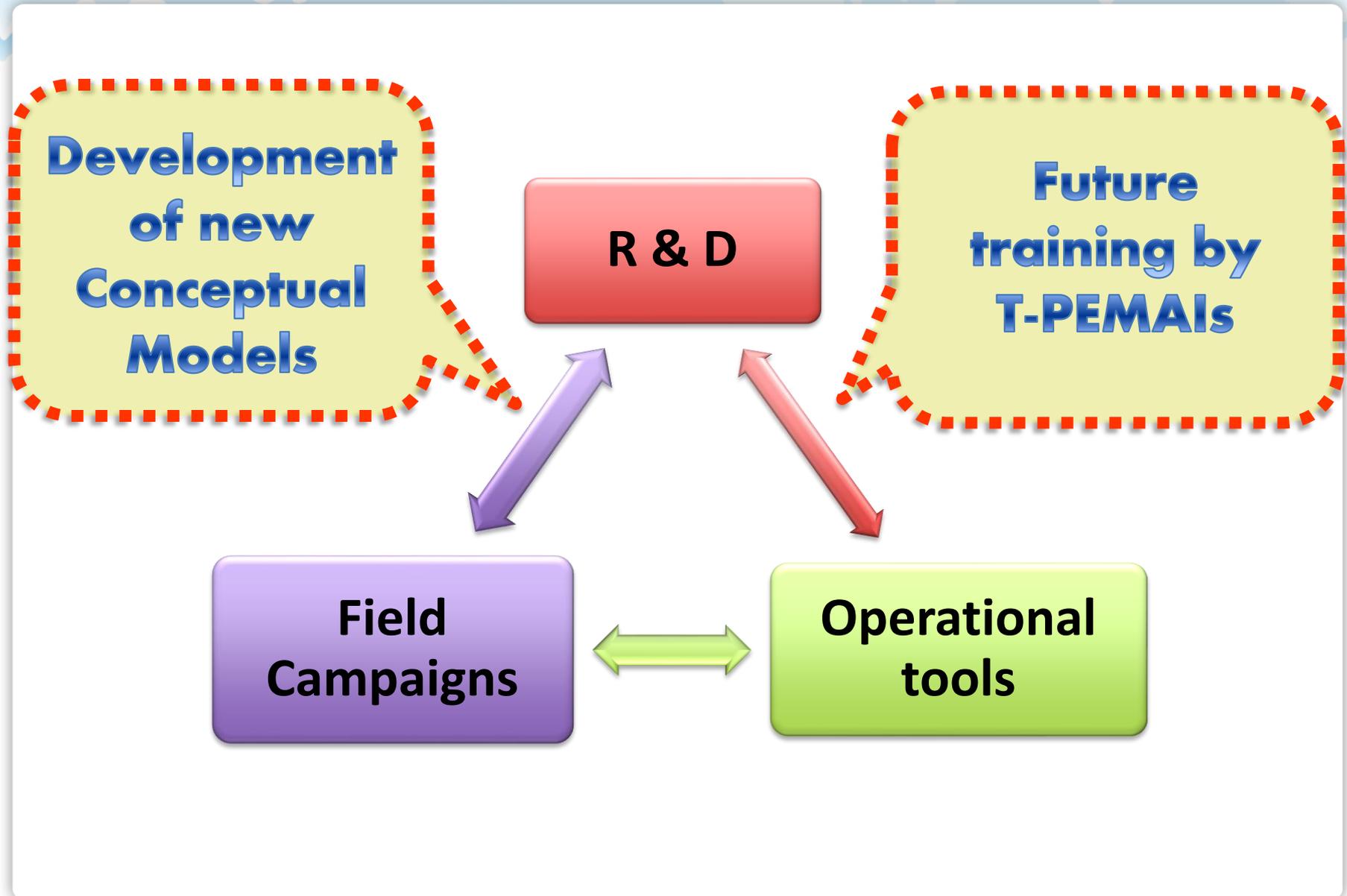
Federico Robledo, Elodie Broche

Soledad Cardazzo, Matias Armanini,

Mauricio Gatto



# Summarizing...



**Thank you very much!**