

Project Number and Title: Project 12 "La Plata Basin floods and droughts: Contribution of microwave remote sensing in monitoring and prediction"

Institution: Institute of Astronomy and Space Physics (CONICET-UBA)

Number of Researchers: Four researchers (Haydee Karszenbaum, Francisco Grings, Mercedes Salvia and Matias Barber)

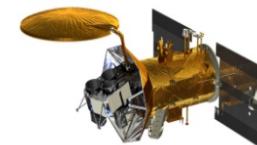
Human Resources Formation: two PhD candidates (thesis finished, to be defended), one PhD student, thesis in progress.

Acquired equipment:

Soil moisture probes (Hydra II, 18), meteorological station (standard, 1), several laptops, servers, etc.

Field campaign:

Areco site (intensive soil moisture sampling during SAR-AT and UAVSAR acquisitions)



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Institution: Institute of Astronomical Sciences (IAA)

Number of Researchers: Four researchers:
Francisco Grings, Mercedes Salvarezza, Daniel

Human Resources Formation: two MSc students (one defended), one PhD student, the

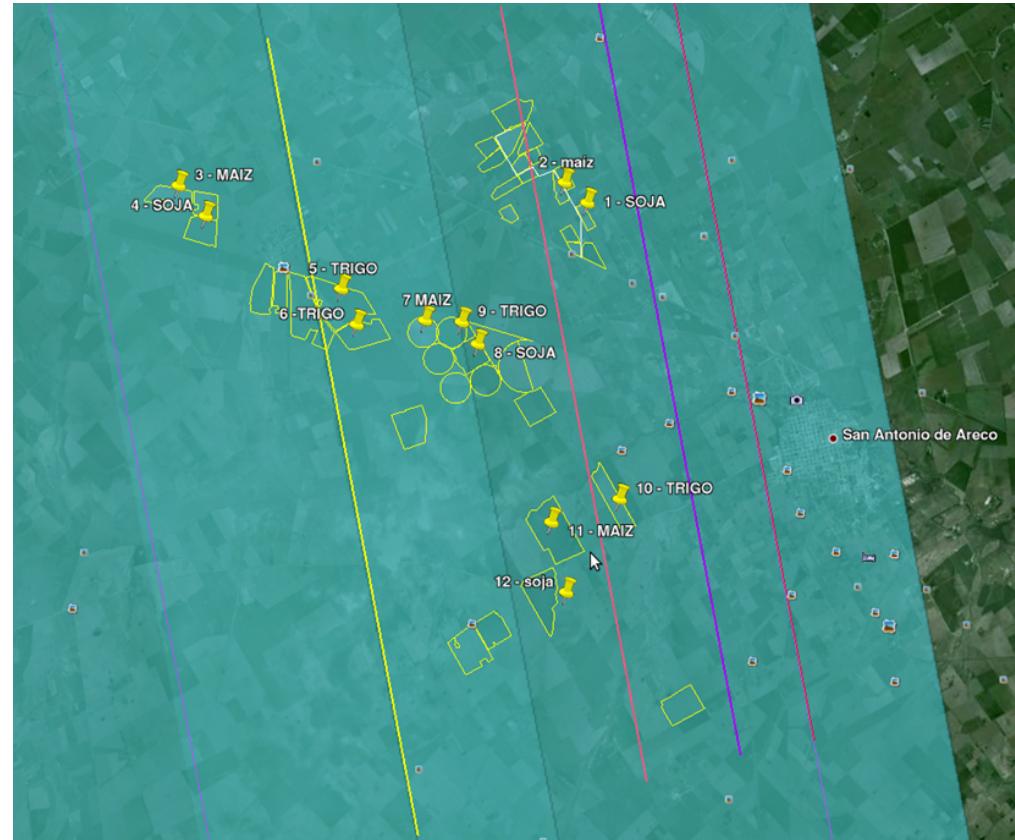
Acquired equipment:

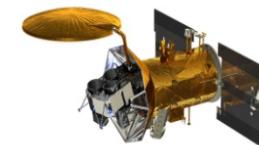
Soil moisture probes (Hydra II, 12 units), several laptops, servers, etc.

Field campaign:

Areco site (intensive soil moisture sampling during SAR-AT and UAVSAR acquisitions)

Areco field site.

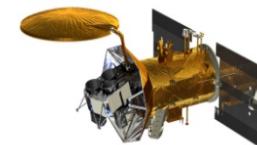




Publications/Congress:

Main subjects:

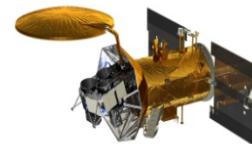
1. SM Retrieval using AQ radiometer/scatterometer
2. Monitoring SM conditions in the Pampas Plains
3. Monitoring floods in the Paraná floodplain
4. Multitemporal analysis of Forest environments
5. MWR radiometer calibration



Publications/Congress:

1. SM Retrieval using AQ radiometer/scatterometer (3 journal papers/9 conference presentations)

- L-band radar soil moisture retrieval without ancillary information, Cintia A. Bruscantini, Alexandra G. Konings, Parag Narvekar, Kaighin A. McColl, Dara Entekhabi, Senior, Francisco M. Grings, and Haydee Karszenbaum, Selected Topics in Applied Earth Observations and Remote Sensing, IEEE Journal of (**JSTARS**), in press, **2015**.
- An Observing System Simulation Experiment for the Aquarius/SAC-D Soil Moisture Product. Bruscantini, C.A.; Crow, W.T.; Grings, F.; Perna, P.; Maas, M.; Karszenbaum, H., IEEE Transactions on Geoscience and Remote Sensing (**TGRS**), vol.52, no.10, pp.6086,6094, Oct. 2014 doi: 10.1109/TGRS.2013.2294915.
- Effect of Forward/Inverse Model Asymmetries Over Retrieved Soil Moisture Assessed With an OSSE for the Aquarius/SAC-D Mission. Bruscantini, C.A.; Perna, P.; Ferrazzoli, P.; Grings, F.; Karszenbaum, H.; Crow, W.T. Selected Topics in Applied Earth Observations and Remote Sensing, IEEE Journal of (**JSTARS**), vol.7, no.3, pp.943,949, March **2014** doi: 10.1109/JSTARS.2013.2265076.

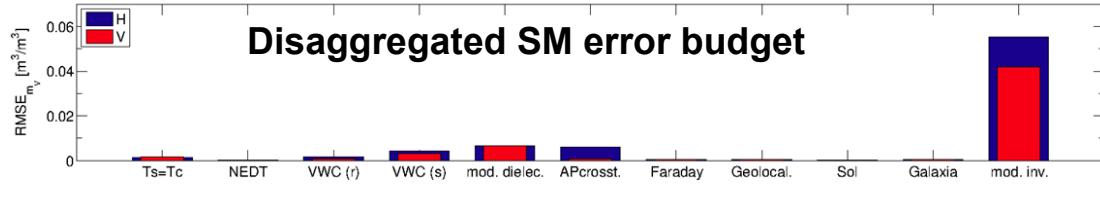
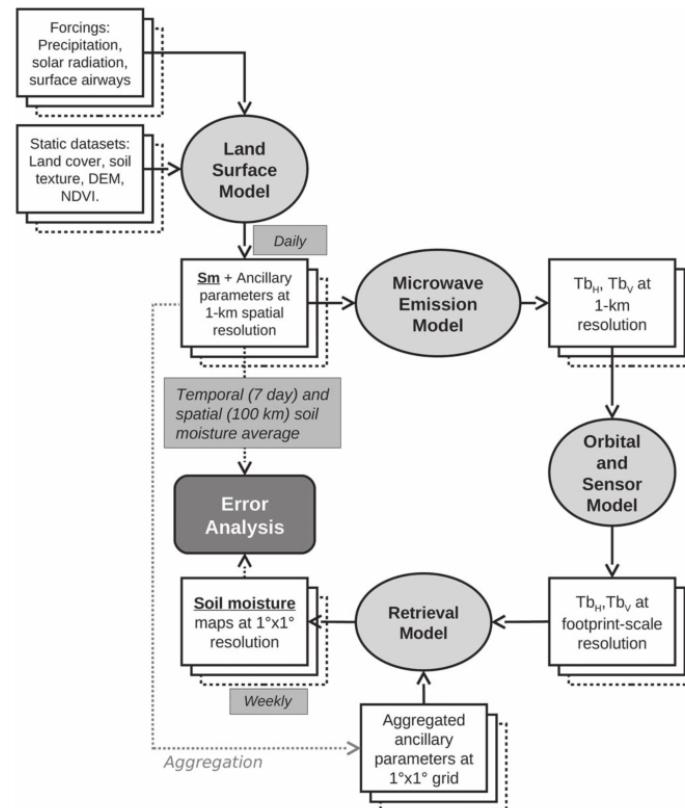


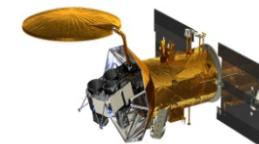
Publications/Congress:

1. SM Retrieval using AQ radar (3 journal papers/9 conference)

- L-band radar soil moisture retrieval
G. Konings, Parag Narvekar, Kaiguang Li, and Haydee Karszenbaum, Selected Papers from IEEE Journal of (JSTARS), in press
- An Observing System Simulation Experiment for Bruscantini, C.A.; Crow, W.T.; Grinberg, M.; Karszenbaum, H., Transactions on Geoscience and Remote Sensing, 2014 doi: 10.1109/TGRS.2013.2265076
- Effect of Forward/Inverse Model Assimilation on OSSE for the Aquarius/SAC-D Mission
Karszenbaum, H.; Crow, W.T. Selected Topics in Sensing, IEEE Journal of (JSTARS), 2013.2265076.

SAC-D/Aquarius OSSE for Soil Moisture





Publications/Congress:

2. Monitoring SM conditions in the Pampas Plains (1 journal paper/ 5 conference presentations)

- Validation strategies for satellite based soil moisture products over Argentina Pampas. F. Grings, C. Bruscantini, E. Smucler, F. Carballo, ME Dillon, E. Collini, M Salvia, H. Karszenbaum., IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (**JSTARs**)
(Volume:8 , Issue: 8) Publication Year: **2015** , Page(s): 4094 – 4105

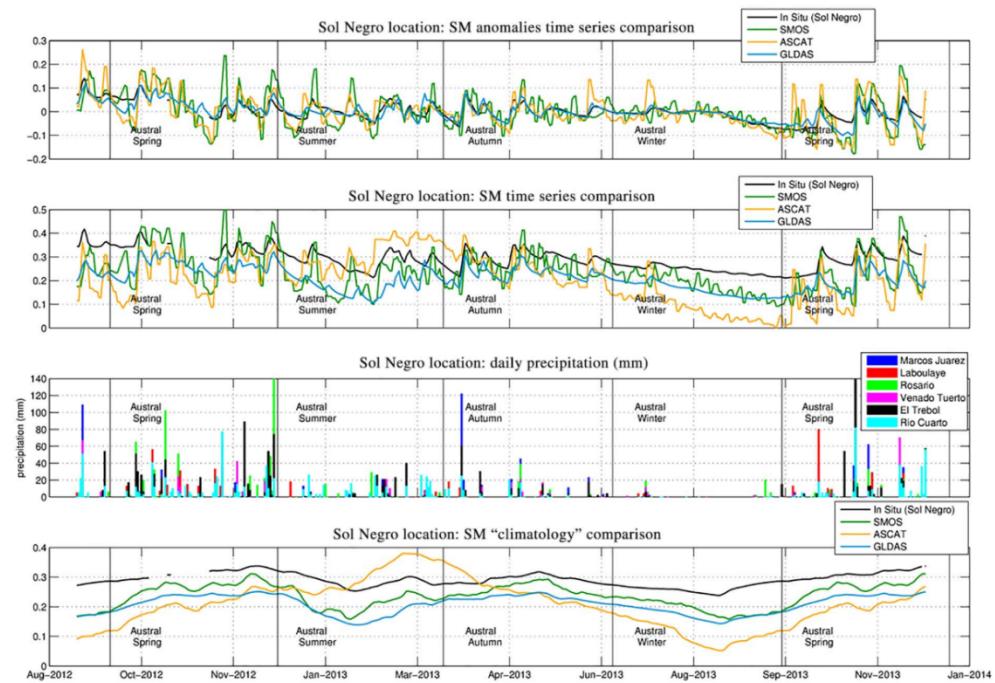


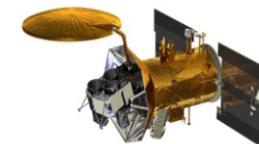
Publications/Congress:

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Journal of Selected Topics in Applied Earth Observations and Remote Sensing
(Volume:8 , Issue: 8) Publication Year:

Satellite SM products evaluation over Pampas

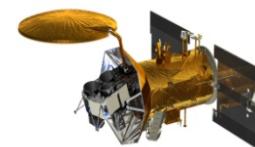




Publications/Congress:

3. Monitoring floods in the Paraná floodplain (1 journal papers/ 4 conference presentations)

- Estimating flooded area and mean water level using active and passive microwaves: the example of Paraná River Delta floodplain. M. Salvia, F. Grings, P. Ferrazzoli, V. Barraza, V. Douna, P. Perna, C. Bruscantini, H. Karszenbaum. Hydrology and Earth Systems Science (HESS), 2011, 15: 2679-2692. doi:10.5194/hess-15-2679-2011.

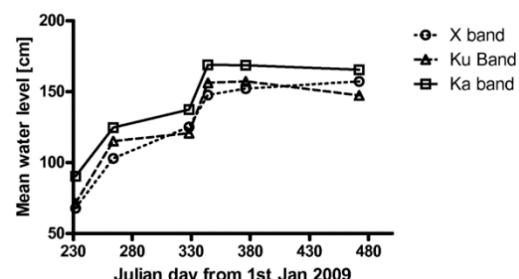
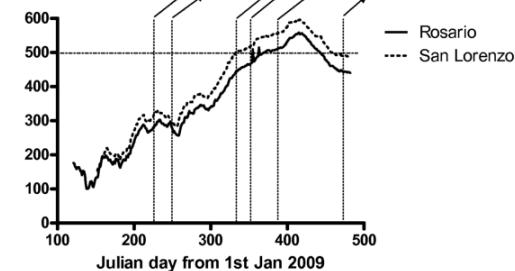
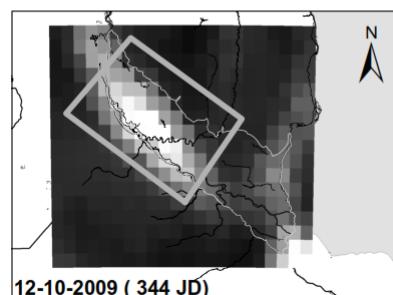
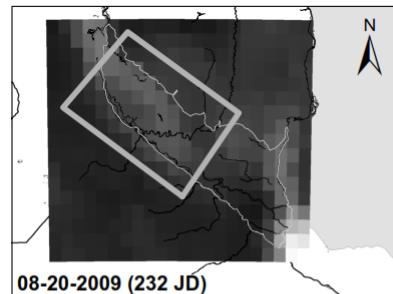


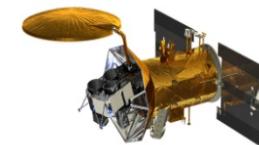
Publications/Congress:

3. Monitoring floods in the Paraná River (1 journal papers/ 4 conference)

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Flood monitoring using passive microwave data

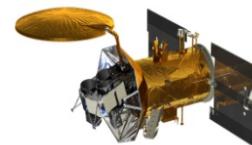




Publications/Congress:

4. Multitemporal analysis of Forest environments (3 journal papers/ 5 conference presentations)

- C-Band Radiometric Response to Rainfall Events in the Subtropical Chaco Forest. F. Grings, V. Douna, V. Barraza, M. Salvia, H. Karszenbaum, N. I. Gasparri, P. Ferrazzoli, and R. Rahmoune. IEEE GEOSCIENCE AND REMOTE SENSING LETTERS (**GRSL**), VOL. 9, NO. 2, MARCH **2012**.
- Behavior of multitemporal and multisensor passive microwave indices in Southern Hemisphere ecosystems. Barraza, V., F. Grings, P. Ferrazzoli, A. Huete, N. Restrepo-Coupe, J. Beringer, E. Van Gorsel, and H. Karszenbaum. Published online 18 DEC 2014 **2014** J. Geophys. Res. Biogeosci. (**JGR**), 119, 2231–2244, doi:10.1002/**2014JG002626**.
- Monitoring Vegetation Moisture Using Passive Microwave and Optical Indices in the Dry Chaco Forest, Argentina. Barraza, V.; Grings, F.; Ferrazzoli, P.; Salvia, M.; Maas, M.; Rahmoune, R.; Vittucci, C.; Karszenbaum, H. Selected Topics in Applied Earth Observations and Remote Sensing, IEEE Journal of (**JSTARS**), vol.7, no.2, pp.421,430, Feb. **2014** – doi: 10.1109/**JSTARS**.. 2268011.

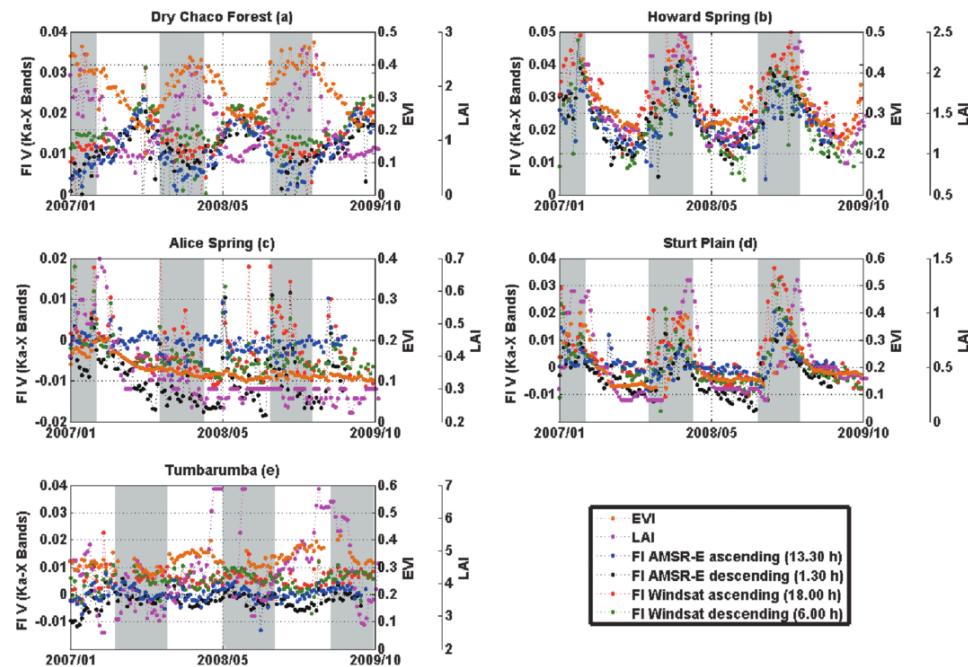


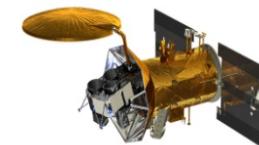
Publications/Congress:

4. Multitemporal analysis of Forests (3 journal papers/ 5 conference papers)

- C-Band Radiometric Response to Rainfall. Douna, V., Barraza, M., Salvia, H., Karszenbaum, H. IEEE GEOSCIENCE AND REMOTE SENSING LETTERS, 10(1), 14–17, 2013.
- Behavior of multitemporal and multisensor passive microwave data for monitoring ecosystems. Barraza, V., F. Grings, P. Ferrier, A. Vittucci, J. Van Gorsel, and H. Karszenbaum. Published in Journal of Geophysical Research: Biogeosciences (JGR), 119, 2231–2244, doi:10.1002/2013JG035300, 2014.
- Monitoring Vegetation Moisture Using Passive Microwave Data in a Dry Chaco Forest, Argentina. Barraza, V.; Grings, F.; Vittucci, C.; Karszenbaum, H. Selected Topics in Applied Earth Observation and Remote Sensing, IEEE Journal of (JSTARS), vol.7 no.7, pp.2268-2280, 2016, doi:10.1109/JSTARS.2016.2532701.

Forest canopy moisture monitoring using passive microwave data

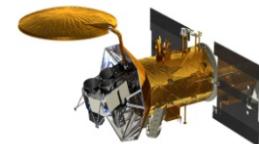




Publications/Congress:

5. MWR radiometer calibration (1 journal paper/ 1 conference presentation)

- Land intercalibration and drift monitoring of MWR radiometer on board SAC-D/Aquarius. Bruscantini C., Maas M., Grings F., Karszenbaum H., IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS), 2015.

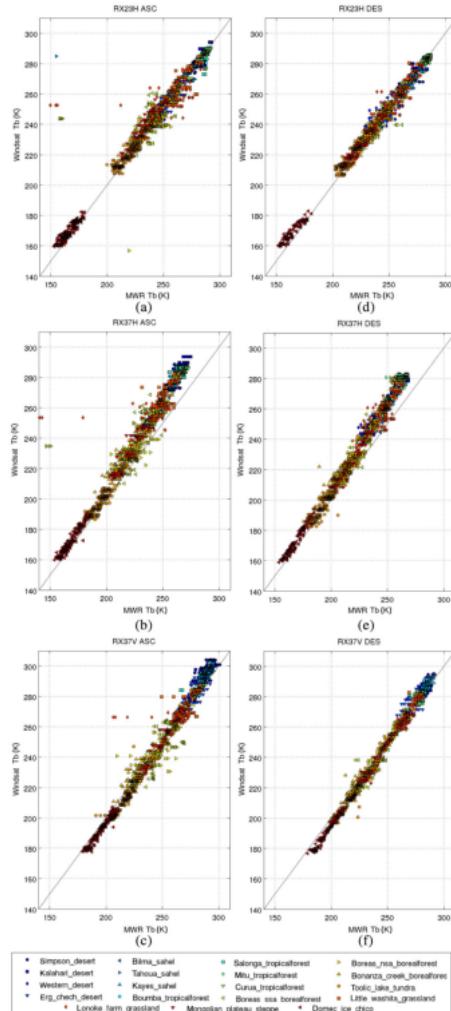


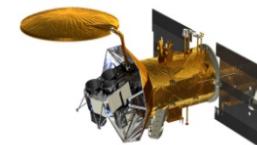
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MWR/Windsat intercalibration





Education & Public Outreach:

2 PhD Thesis

- Veronica Barraza, "Modelos y aproximaciones basadas en información satelital en microondas pasivas para la estimación de la Evapotranspiración en áreas boscosas de la Cuenca del Río Bermejo", **FCEN-Ecología**, 2015.
#evapotranspiration estimation #passive microwave

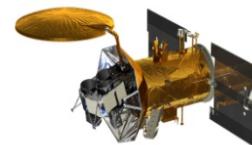
Cintia Bruscantini, "Implementación de un Experimento de Simulación de un Sistema de Observación del sistema SAC-D/Aquarius para la validación del producto humedad del suelo", **FIUBA**, 2016.

#SAC-D/Aquarius OSSE #SM product

Other:

Technology transfer:

- **MWR intercalibration (CONAE)**
- **L Band field Dicke Radiometer** (cooperation with Linwood Jones, CFRSL)



Education & Public Outreach:

2 PhD Thesis

- Veronica Barraza, "Modelos y algoritmos para la estimación de la evapotranspiración en áreas boscosas de la Cuenca del Plata", FIU, #evapotranspiration estimation

Cintia Bruscantini, "Implementación del Sistema de Observación del sistema Estacional (OSSE) para el producto humedad del suelo", FIU, #SAC-D/Aquarius OSSE #SM products

L Band field radiometer test #1

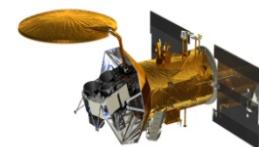


Other:

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Acknowledgments

- to NASA and CONAE colleagues who selected the projects, in particular Dr Levine for its continuous support.
- to NASA Science team, which provided a lot of intellectual support and encouragement.
- to CONAE's PIs and colleagues, who systematically supported our initiatives and responded to our requests for in situ data.
- among several colleagues, we want to specially mention Dara Entekhabi, Wade Crow, Simon Yueh, Linwood Jones and Paolo Ferrazzoli. They helped us with publications, software, suggestions and feedback.
- the last but not the least, the two students more strongly related to the project (Cintia and Veronica) who joined as PhD candidates and became the motor of this project.