RESEARCH HIGHLIGHT

TiFlow

Software developed by Julien HERRERO, PhD student (ASGA)

TIFlow (transdimensional inversion of flow data) is a software entirely developed in Python for stochastic inversion aimed at characterizing the uncertainties of parameters in a geological model. The algorithm operates on two-dimensional stratigraphic layer geological models with a transdimensional inversion, meaning that the number of layers in the model is variable, and thus the number of parameters is an unknown of the problem. TIFlow includes parameterizations of more or less complex models, and can perform inversions using either individual types of data such as well logging, seismic, and dynamic flow data, or through joint inversions combining these data types. The outputs are statistics and uncertainty maps of accepted (i.e., likely) realizations from all the generated models.

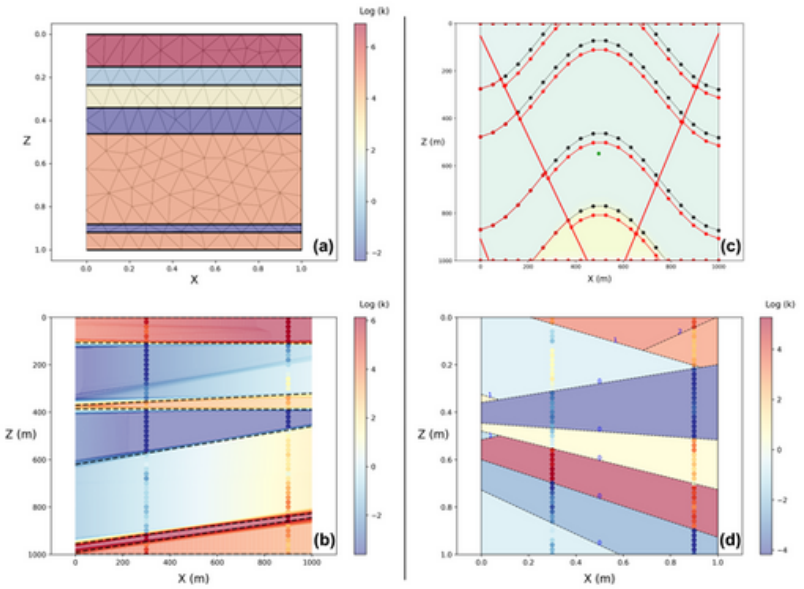

Figure 1: Different parameterizations of a 1D-2D layered geological model proposed by TIFlow

ALUMNI TESTIMONIAL

Margaux RAGUENEL, Reservoir Engineer at TotalEnergies - RING PhD student 2017-2019

During my PhD, I enjoyed discovering new things and being at the interface of several fields, which allowed me to meet a lot of people.
I have many memories of both individuals and moments spent at RING. It is hard to pick one but I believe we can truly highlight the support of the team, both literally and figuratively, in all circumstances.
Not only from a scientific perspective, as everyone is always available for discussions, exchanging opinions, or providing help, but also in a more down-to-earth manner. For instance, during our field trip to the Dolomites, my knee was still rehabbing, and team members took turns carrying my backpack.
What I appreciated at RING was the cross-disciplinary nature of research projects, with the team's expertise recognized on various subjects related to subsurface modeling.

RING RESEARCHERS AND STUDENTS HAVE A SOLID BACKGROUND IN APPLIED MATHEMATICS, STATISTICS AND PHYSICS,AS WELL AS AN EXPERIENCE IN COMPUTER PROGRAMMING.

Work with us

POST DOC OPPORTUNITIES

We welcome Post Doc researchers who are interested in working on RING's research topics and we support funding applications to Marie Skłodowska-Curie Actions, Fond National Suisse, and others.

A two-year postdoc position is currently open to applications until **July 15, 2024:**
Tetrahedral mesh updating for subsurface modeling: line and finite surface insertion.

MASTER OPPORTUNITIES

We offer Master internships for students who undertake the ENSG Numerical Geology option.
To apply, students must enter the ENSG's "Diplôme d'ingénieur" either in first year after an entry exam or a Bachelor, or in 2nd year after a M1.
Students with a M1 (or a M2 in Sciences of the Earth) can also apply directly for a Master 2 STPE / GEIR.
Applications for the new MSc specialty in numerical geology are already closed on CampusFrance and monmaster.gouv.fr but are still open on : **e-candidat.univ-lorraine** until **June 15, 2024.**

PORTRAIT

Giusi RUGGIERO, 2nd year PhD student

I started my PhD at RING in September 2022. Before that, I completed a Bachelor degree in Geological Sciences at Sapienza University, in Rome, and a Master degree in Exploration and Applied Geophysics at the University of Pisa.
My research aims at quantifying structural uncertainty. To this end, we adopt an alternative approach based on a two stage inversion: the first one implies the use of the homogenization operator in the context of Full Waveform Inversion (FWI) of seismic data with the aim of recovering a smooth effective medium ; the second inversion is performed in order to recover small scale information in terms of geological structures through a downscaling inverse problem, also called inverse homogenization. The downscaling is solved using a Bayesian formulation with a MCMC algorithm, thus obtaining a probability distribution over possible fine-scale geological models.
What I enjoy about researching is to continuously learn something new and challenge myself in new ways. I find it stimulating and a valuable opportunity for personal and professional growth.
I had just started the PhD when I attended the IAMG conference in Nancy. Meeting young researchers from different countries and discovering their studies was a great welcoming to the research environment and gave me the right motivation to start this journey.
I really appreciate the friendly and supportive work environment at RING. Everyone is incredibly collaborative and ready to offer suggestions and help. I like the fact that very often we enjoy spending time together outside of work. This team's spirit makes working here a great experience.
Outside of work, I enjoy practicing yoga/pilates and spending good time outdoors with friends. During weekends, I particularly like discovering places around the region and making new experiences.
Before starting my PhD, I did not know a lot about this French region and the city. I discovered that Nancy is a city full of art. Apart from museums, there are numerous examples of Renaissance and Art nouveau architecture around the city which makes it very elegant. Moreover, it is a very active city, full of students, offering various musical and cultural events every month of the year.

AFTER WORK

TEAM-BUILDING ACTIVITIES ARE ALSO PART OF THE LIFE AT RING. AS WE WELCOME PEOPLE FROM ALL AROUND THE WORLD, IT IS IMPORTANT TO US THAT WE INCLUDE EVERYONE AND MAKE PEOPLE FEEL LIKE THEY'RE "PART OF THE FAMILY" INSIDE AND OUTSIDE THE WORK ENVIRONMENT.

Discovery of local restaurants

Visit of Marseille

Trip to Italy

Summer gig