Météo-France DSM/LabIA on EWC at ECMWF

Frank Guibert, DSM/LabIA

frank.guibert@meteo.fr

26th of September 2023

Who are we ?

The team

Léa Berthomier
Data Scientist

Bruno Pradel
Data Scientist

Isabelle Beau
Team Leader

Frank Guibert
Lead Dev / Data
Scientist

Théo Tournier
Data Scientist

Mathilde Ferreira
Apprentice

Our missions ?

- Applied innovation team from ideas to operations

- AI hub at Météo-France: centralise + share expertise and knowledge with our colleagues

- We work for any Météo-France directorate with a project validated by our steering committee

- Typical projects span over 1 - 1.5 year

- Mostly deep-learning projects using convolutional architectures (DeepLabV3+)

- Currently investigating vision transformers and Graph Neural Networks

An example of what we do: rain estimation from satellite channels using CNN
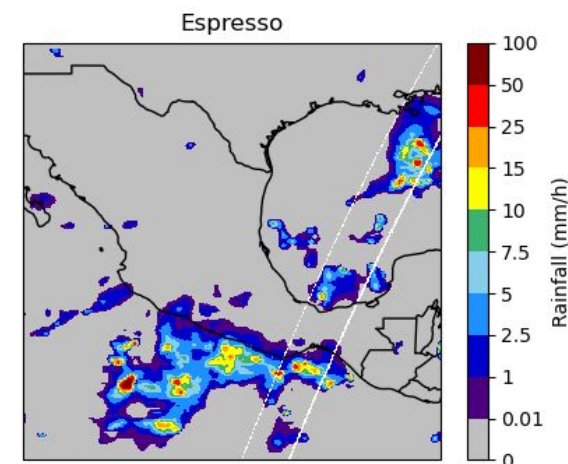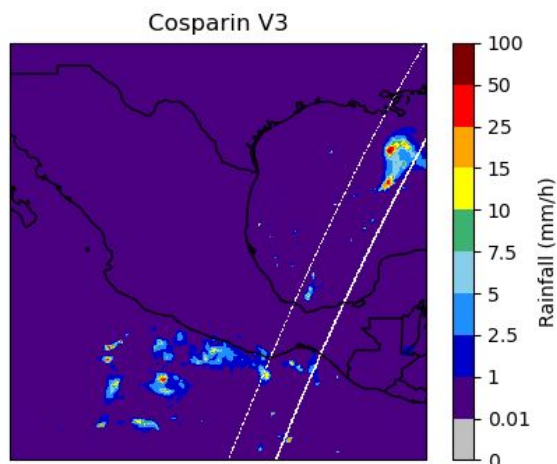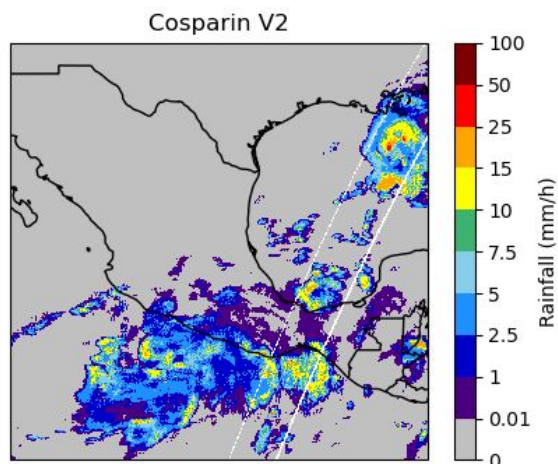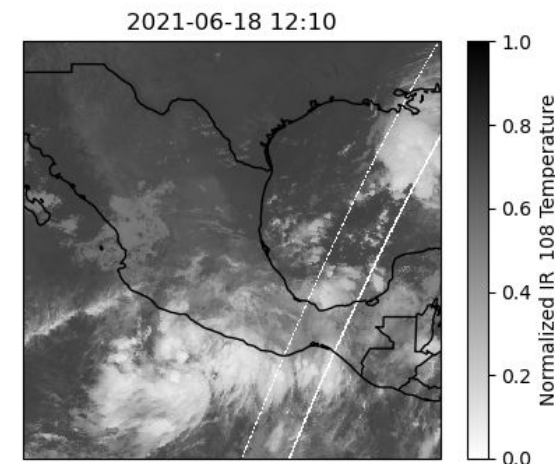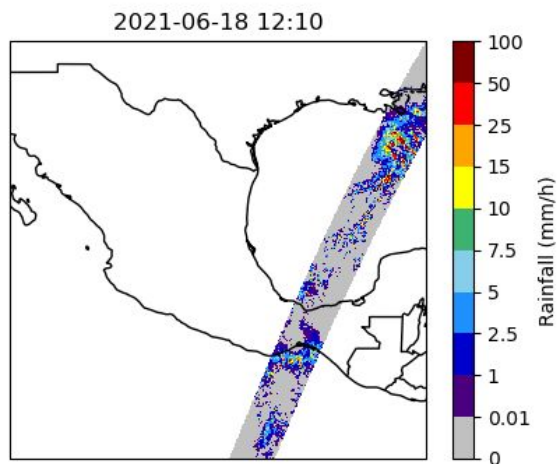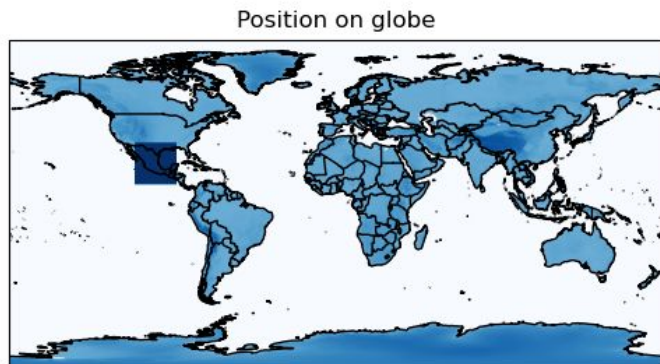
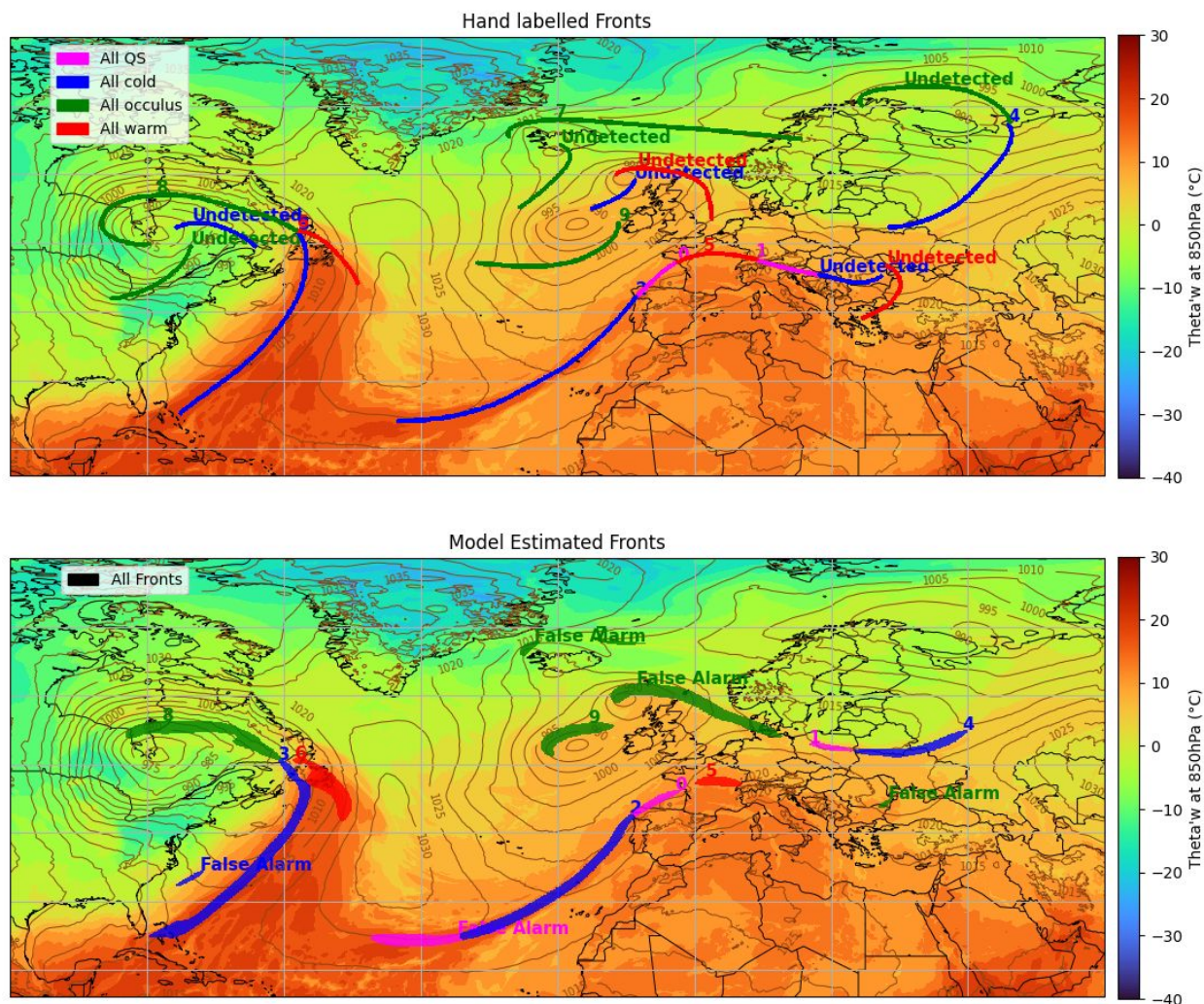~ 1.5 TB dataset, 4 hours training using Data Parallel on 4 GPUs Tesla V100 (MF AI infra)

Another deep-learning example: automate ANASYG and PRESYG initialisation using ARO and ARO-IFS

ANASYG 2022-12-24 18h +00h - ARPEGE Theta'w at 850hPa; MSLP; Fronts

~ 543GB dataset, 4 hours training using 1 GPUs Tesla V100 (MF AI infra)
First benchmark shows training is slightly faster on a EWC node

Our tools

Our tools

- Visual Studio Code + remote SSH for productivity

- git, gitlab + Peer reviewed Merge Request + a dedicated CI for code quality

- docker + pip to manage our dependencies and ensure reproducible environments

- Keras, PyTorch, PyTorch-lighting for structuring projects

- cartopy, matplotlib, TensorBoard for data visualisation

- py-spy and PyTorch profiler for finding bottlenecks

- Cython, Numba, Cupy and tensor operations for optimisations

- resnet, U-Net, DeepLabV3+ : off the shelf architectures we use a lot

Our plans at EWC

Our plans at EWC

- Still under-construction since we joined last month !

- Test the latest PyTorch versions on our projects

- R&D on vision transformers and benchmark versus DeepLabV3+

- R&D on Graph Neural Networks

- Run some of our Deep-Learning experiments for our projects

EWC advantages

- Combines security and flexibility

- Latest NVIDIA drivers

- Permissive VM with GPU ideal for R&D and technology watch/test libraries and frameworks, dig into code from papers...

- User-Friendly web admin interface to provision/monitor/take down VMs

- Right now, for us, ideal for medium sized projects

- The support team

Thanks for your attention !