

# ALADIN status overview

*Piet Termonia*



# Organizational aspects

- Organizational news::
  - Welcome to the new LACE PM; Yong Wang. Looking forward to work with you Yong.
  - Maria Derkova will be our new ACNA
  - Christoph Zingerle as CSSI member for verification
- A task force (JO, SJ, CF, MS, PT) to analyze possibilities for a further merge between the two consortia:
  - There will be a common PAC/HAC meeting on 6 May in Toulouse to look into this.
  - Some ongoing action: the proposal of Roger of last year and the following system WW in Ankara, details to be discussed this week. The aim is to install the HARMONIE system (see the talks of Ulf and Xiaohua).
- We had a first trial CSSI video conference we should do this in the future!
- Some presentations could be candidates for a paper in the newsletter? Speakers may be contacted.



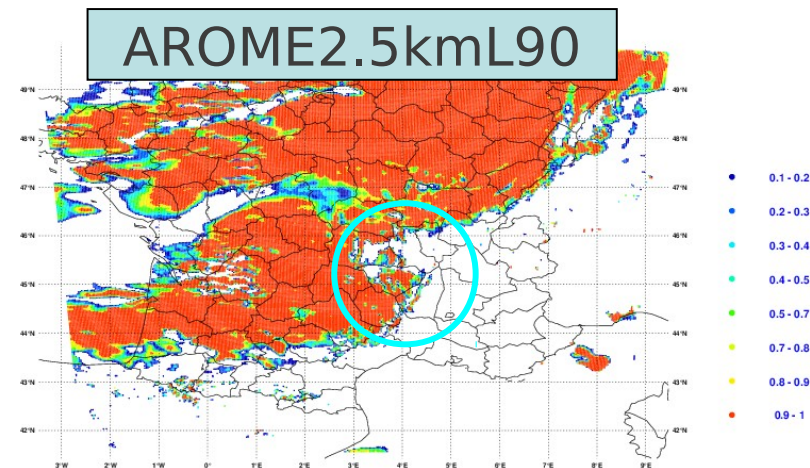
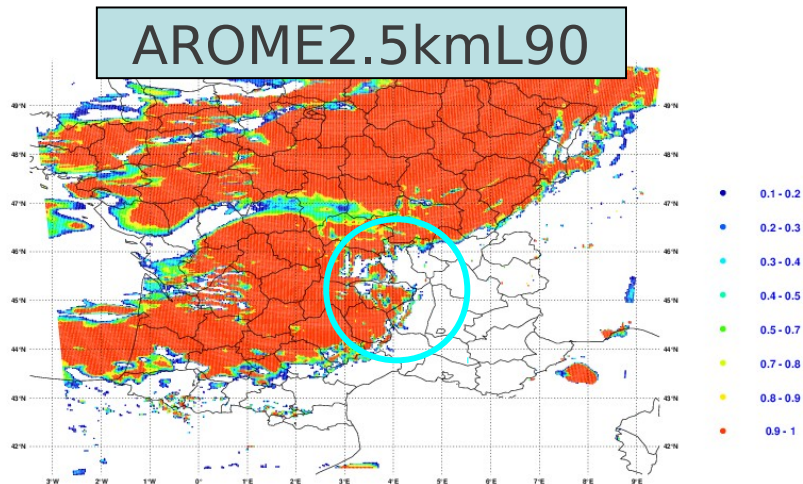
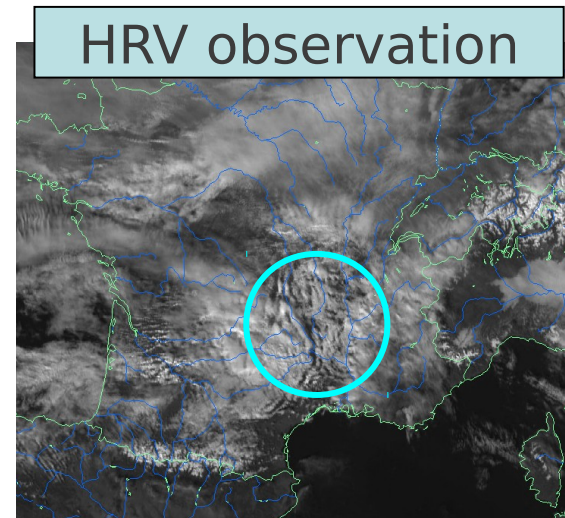
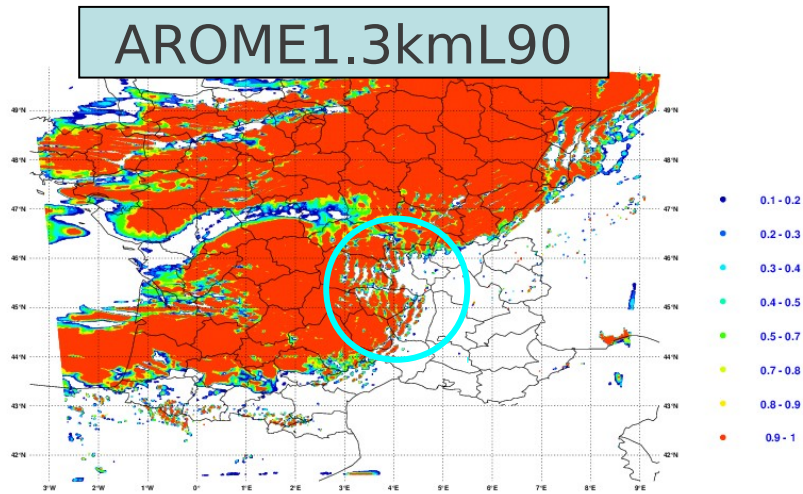
# Some highlights and questions

- **Increasing the resolution:**
  - **MF's experience**
  - **Brief report of the COST ES0905 action**
- ALARO-0 baseline is ready (talk of Radmila).
- Verification, the HIRLAM/ALADIN package now has a name: HARP (talk of Christoph)
- GLAMEPS without ECMWF: providing the best LAM EPS for all the (ALADIN) partners.
- Multi physics convection-permitting EPS, recall memory-stochasticity-laterality of deep convection (Harmon EPS, Inger-Lise)
- A trend towards FE's: VFE (talk of Jozef Vivoda) and HFE (talk of Daan Degrauwe)
- **SURFEX optimization**
- DA: hybrid 3Dvar, 4Dvar, EnsDA, field alignment (a few talks on that?)



# Increasing the resolution : Prototype AROME 1.3km

- Runs OK with dt=45s PC\_CHEAP (NSITER=1), LGWADV
- Stronger NH impact at 1.3 km (orographic waves): 31st January 2013 +14TU



Courtesy Yann Seity

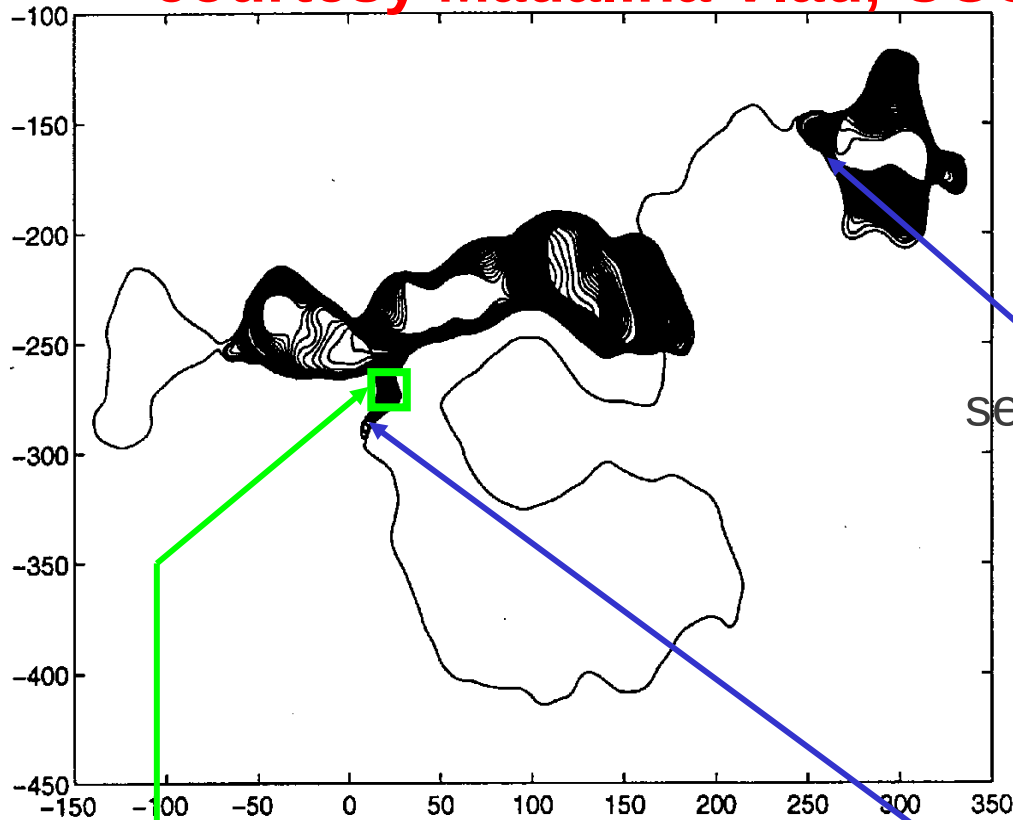


# COST ES0905, Theoretical Studies of the Convection Parameterization Problem, note from F. Spineanu

- Transport can be by non-local coherent structures (in turbulence: a jet, a vortex, convection) or local turbulent diffusion. The transport due to coherent structures can be much faster than local diffusion.
- It is well-known things about non-linear systems are chaotic:
  - There are states in phase space that can never be reached
  - **Some specific state can only be reached if one starts from an initial state in a part of space that is extremely small (i.e. the probability you hit this initial state is extremely small)**
- Due to the above points nature can build coherent structures while the model may not.
- A discretized system has a lower finite volume of phase space (model state) than the infinite reality. **But, by increasing the resolution one might expect to increase the chance of wrong coherent structures.**
- So far in our AROME/ALARO models it works because we are relying a dynamics of effective lower dimensions (slow manifold).



In simplified models this can be studied with mathematical methods  
**courtesy Madalina Vlad, COST ES0905 Palma, Spain**

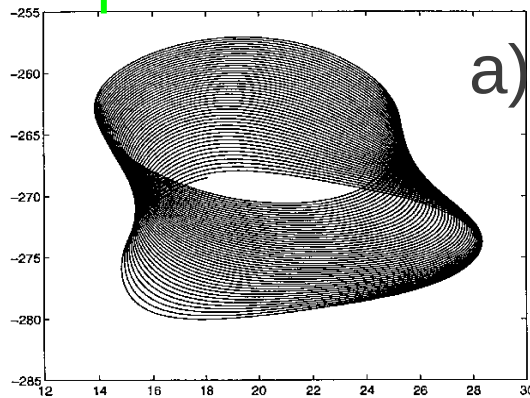


$$\vec{v}(x, t) = -\frac{\nabla\phi \times e_z}{B}$$

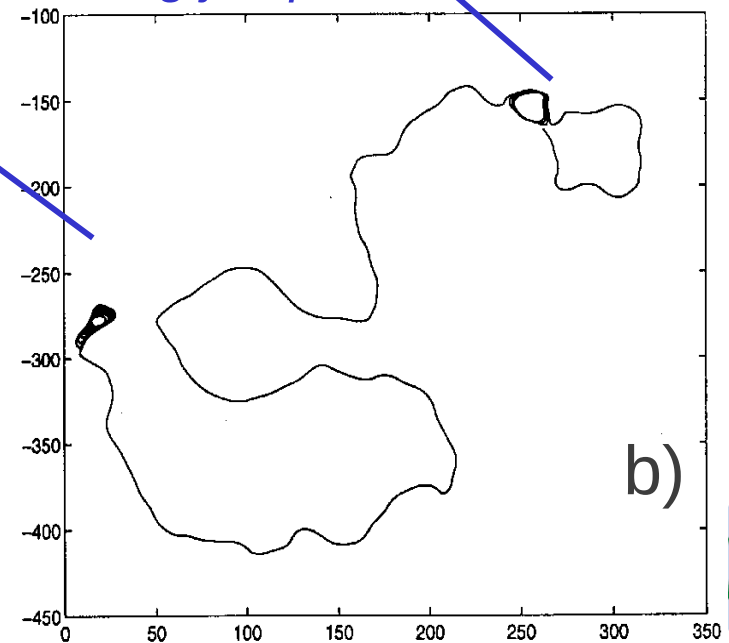
A typical trajectory for large K:  
 sequence of trapping events and long jumps

(The two segments a), b) correspond to the  
 same time interval)  
 Trapping at all scales

Trapping event



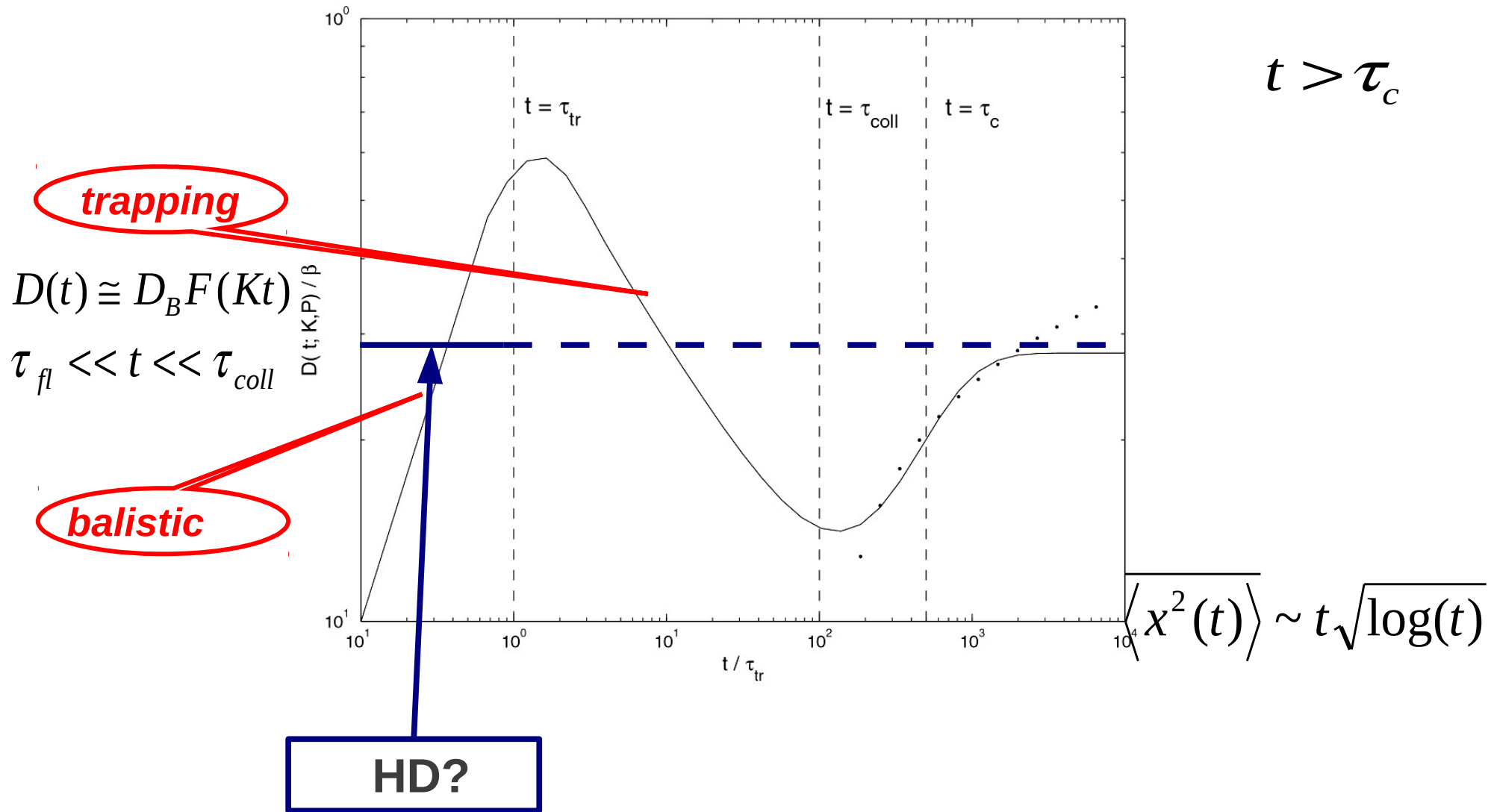
Long jump



Different regimes (ballistic vs. local diffusive).

A horizontal diffusion a priori does not distinguish between them

- The running diffusion coefficient (for weak collisions)



$$\tau_{coll} < t < \tau_c$$

See COST ES0905 action for the full presentation



## Increasing the resolution is not sufficient to deliver good high-resolution forecasts

- In turbulence simulations (fluid and plasma turbulence, in solid state physics, polymers, etc) one should be prepared to represent both diffusive processes and coherent behavior.
- Expressing the process in flux form  $\Gamma = -D \frac{\partial n}{\partial x}$  ,
- this is done by adding a “convection” term (F. Spineanu):
- $$\Gamma = -D \frac{\partial n}{\partial x} + \int dx' G(x - x', t - t') n(x', t')$$
  - Increasing the resolution does not do the job by itself
  - **One should not forget to take care of the intermediate scales also**, for instance by a parameterization.

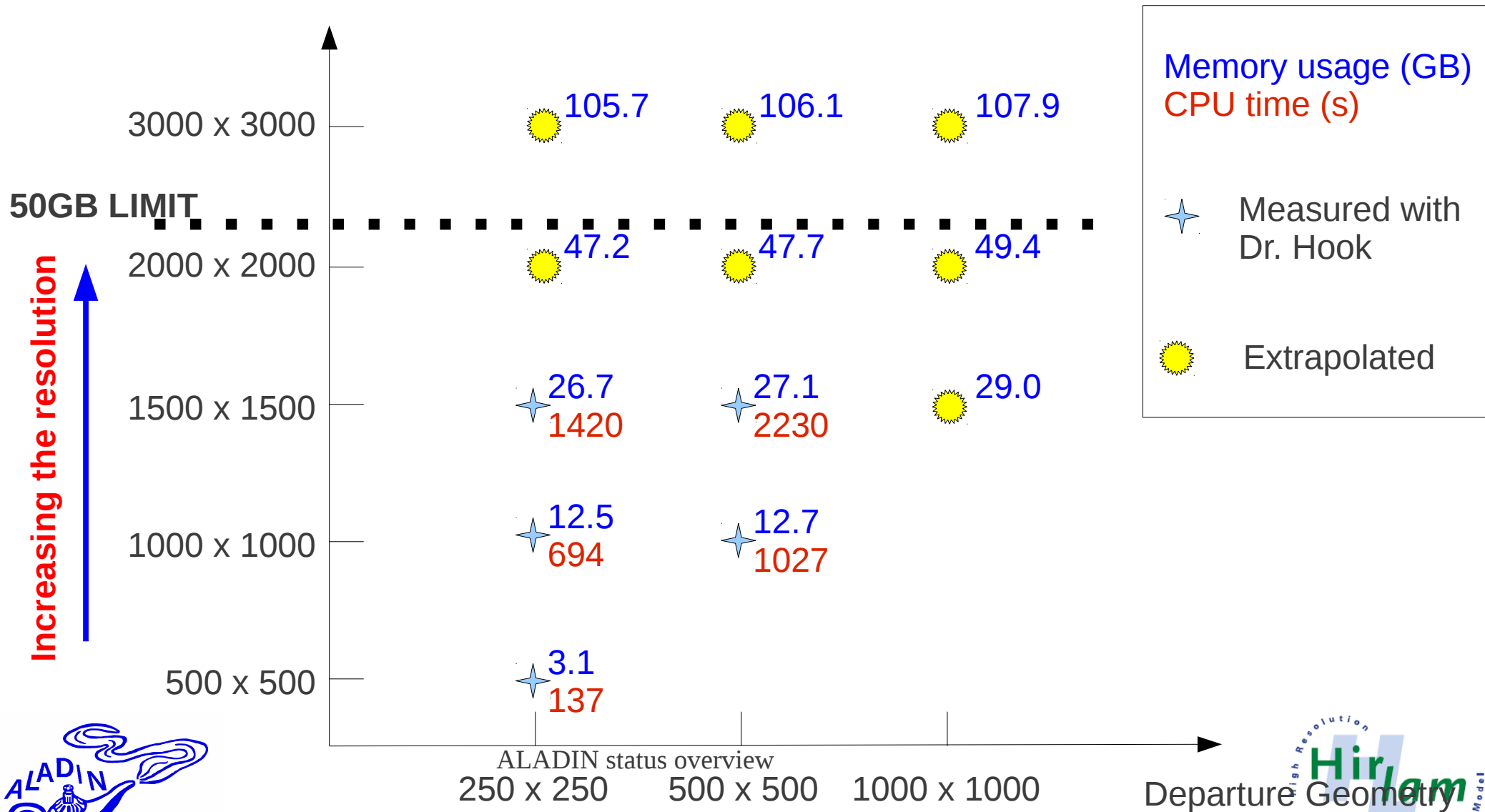
This COST action ends next year and it will be good to look at the outcomes





# PREP: memory consumption, work of Tayfun Dalkilic and Daan Degrauwe

Target Geometry



The landscape seems calm and quiet now  
on Iceland ... Enjoy!



*A horse and Hekla vulcano source wikipedia*

