



A new systematic strategy for choosing the coupling update frequency

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Bratislava*

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Contents

- Aliasing due to interpolation of coupling data

Contents

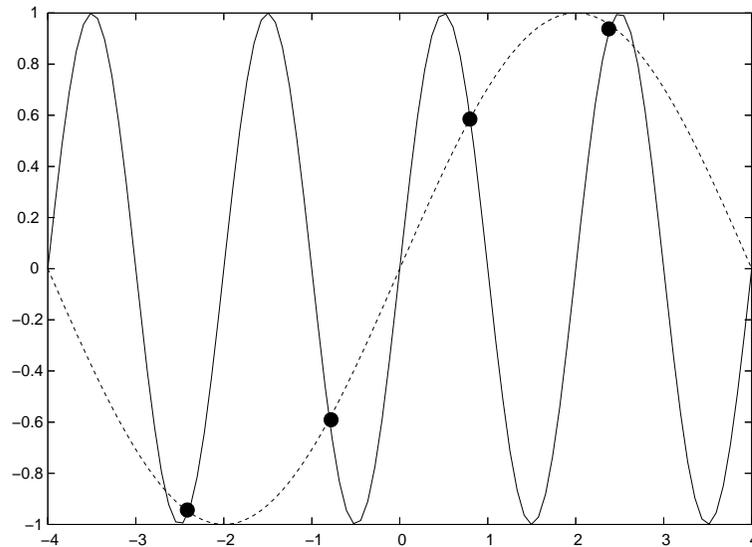
- Aliasing due to interpolation of coupling data
- A new field in the coupling files

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- Aliasing due to interpolation of coupling data
- A new field in the coupling files
- How to use it?

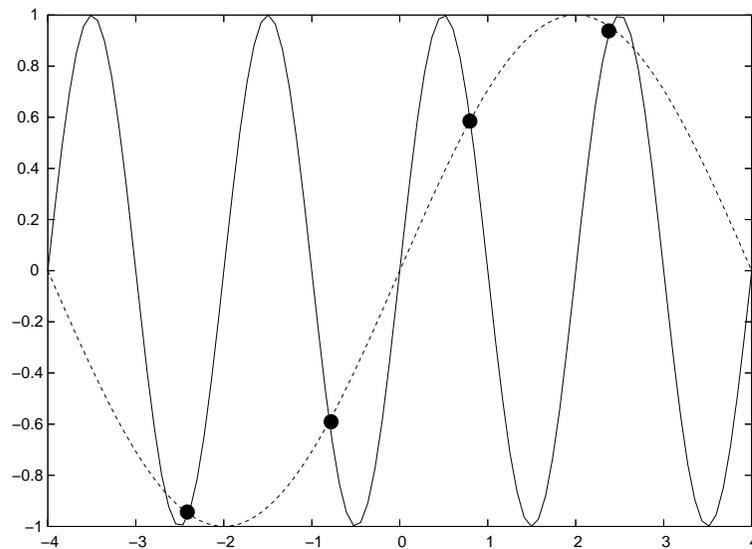
Undersampling

- for $|\omega| > \frac{\pi}{T} \equiv \omega_N$



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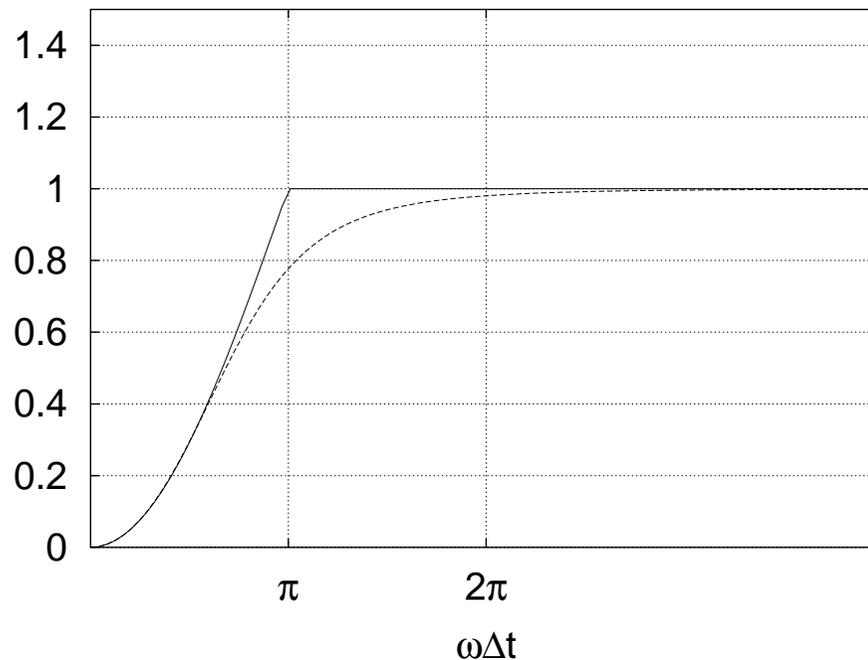
- the amplitude is OK, but the detected frequency is wrong

High pass filter

- The amount of aliasing can be estimated by a high-pass filter

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- E.g.



Can be computed recursively

- recursive computation

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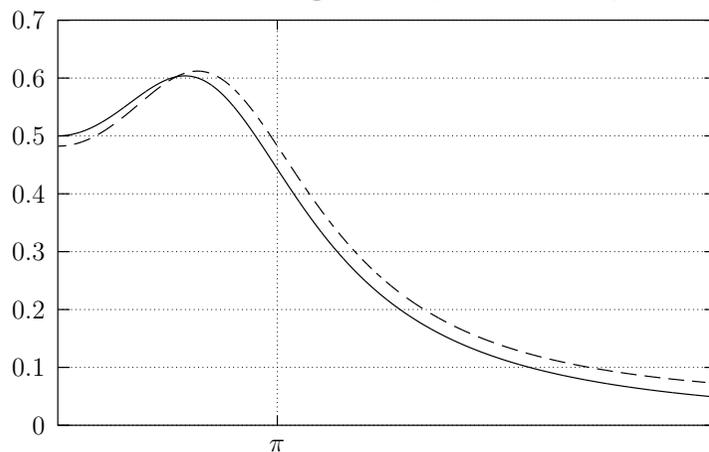
- allows computation during the coupling run

Can be computed recursively

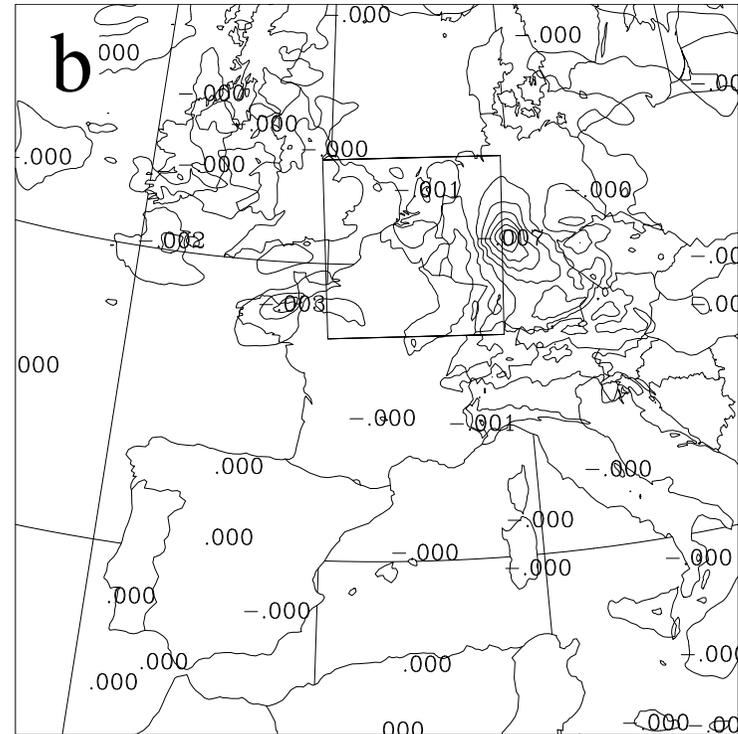
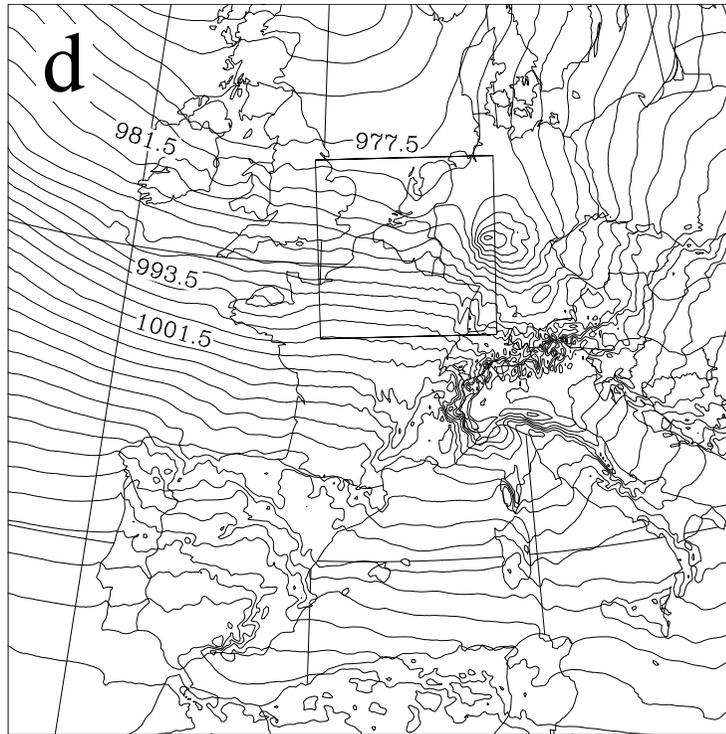
- recursive computation

$$y_k = \sum_{m=0}^N a_m x_{k-m} - \sum_{n=1}^N b_n y_{k-n} ,$$

- allows computation during the coupling run
- but has a group delay

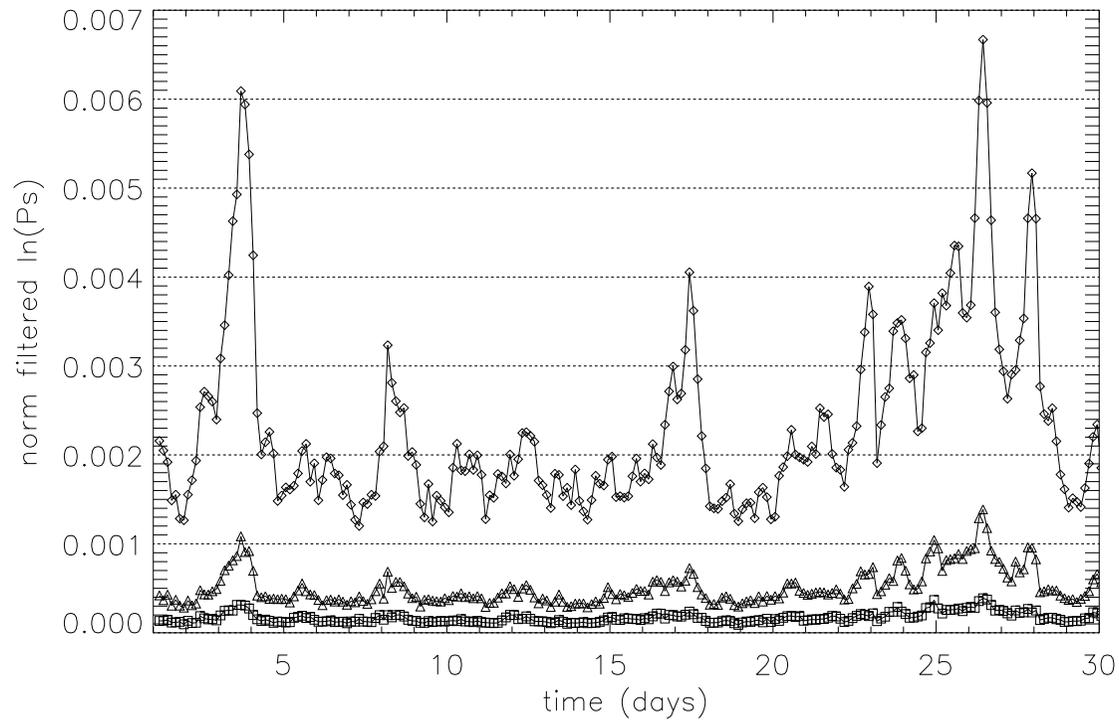


Example: the 26/12/1999 Christmas storm



$\ln P_s$ and filtered $\ln P_s$

December 99



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- compute this filtered field during a forecast

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- TO BE DONE: conf 927 to put it in the coupling files.

Proposal for a coupling strategy

- Before using the coupling file check the the maximum value of the coupling index field in your domain (or coupling frame)

Proposal for a coupling strategy

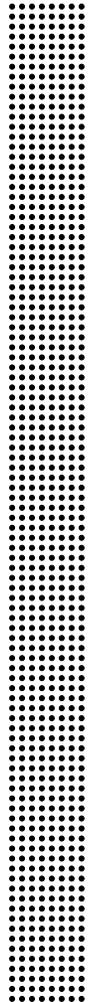
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- if the maximum value exceeds a threshold value then download more coupling files to couple with 1 hour frequency

Proposal for a coupling strategy

- Before using the coupling file check the the maximum value of the coupling index field in your domain (or coupling frame)
- if the maximum value exceeds a threshold value then download more coupling files to couple with 1 hour frequency
- the price to be paid is a delay in the forecast: up to each country to decide if they want it.

How many time do we want it to happen

- what is the probability that a predefined value will be exceeded in a 8×100 frame?
- put this frame arbitrary in the domain
- during the month December 1999
- get statistics from the distribution of the maximum values of the filtered $\ln P_s$



Quantiles

- the different quantiles of the distribution

90 %	95 %	99 %	99.5 %	99.9 %	99.95 %	99.99 %
0.000127	0.000206	0.000501	0.000685	0.001291	0.001647	0.002736

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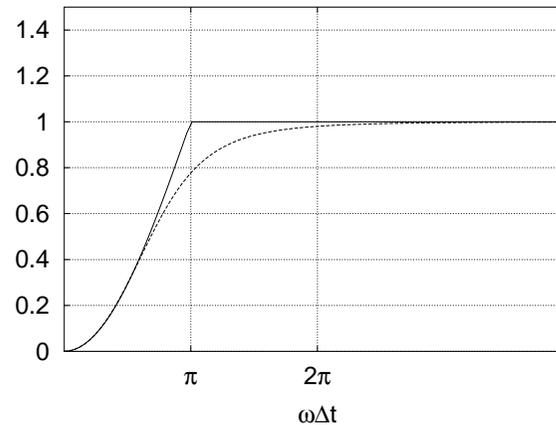
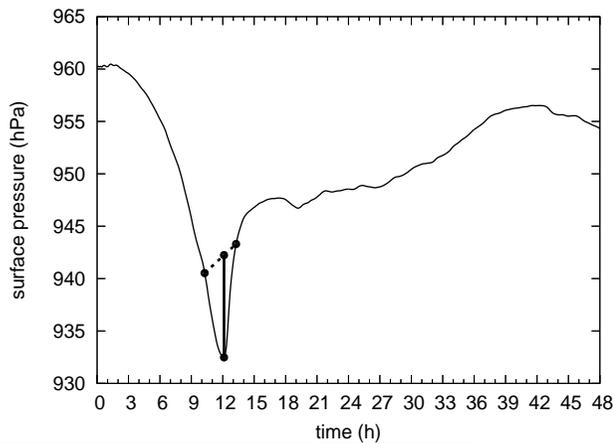
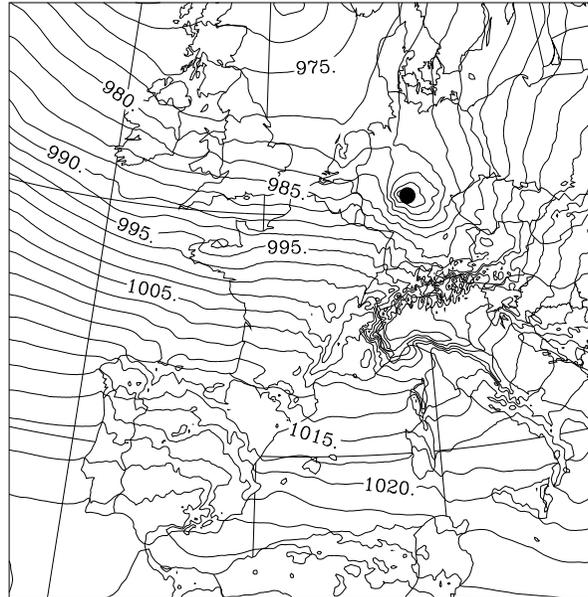
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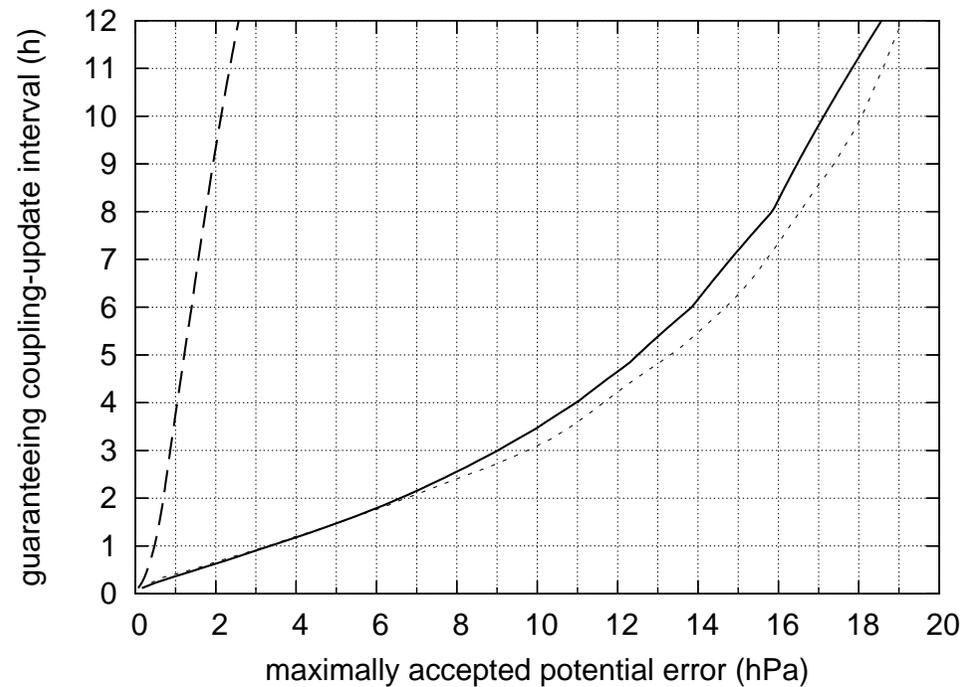
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- so if we want a precision of 0.001 we are slightly below the 99.9% quantile.
- this means that in 99.9% of the cases you will just couple with 3-h updates
- of course you can go below this

How frequent is frequent enough?



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Proposal and conclusions

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- this should be revisited for kilometer scale (AROME)