

The initial screen level temperature, the relation to surface analysis and free atmosphere analysis, a preliminary test.

The problem in HIRLAM, in connection with the Newsnow-scheme:

- First the T2m-analysis is done starting from a first guess
- Then the analysis increment is spread to the surface temperatures of the different tiles
- Then the free atmosphere is analysed
- DFI is performed, and after that the surface temperatures of the surface analysis is put back again
- The surface temperatures T2m created at time=0 could differ very much from analysed values

The reason is that the changes in the surface temperatures of the different tiles create T2m-temps, are not in balance with the free atmosphere, and also that the problem is very non-linear since the average T2m is composed by values from very different tiles.

This points to a variational approach, like that of Balsamo

In this test I have tried to do it at initial time only, and not in the more physical, but expensive 4D-approach.

Unfortunately, due to technical problems, I can not show so much right now

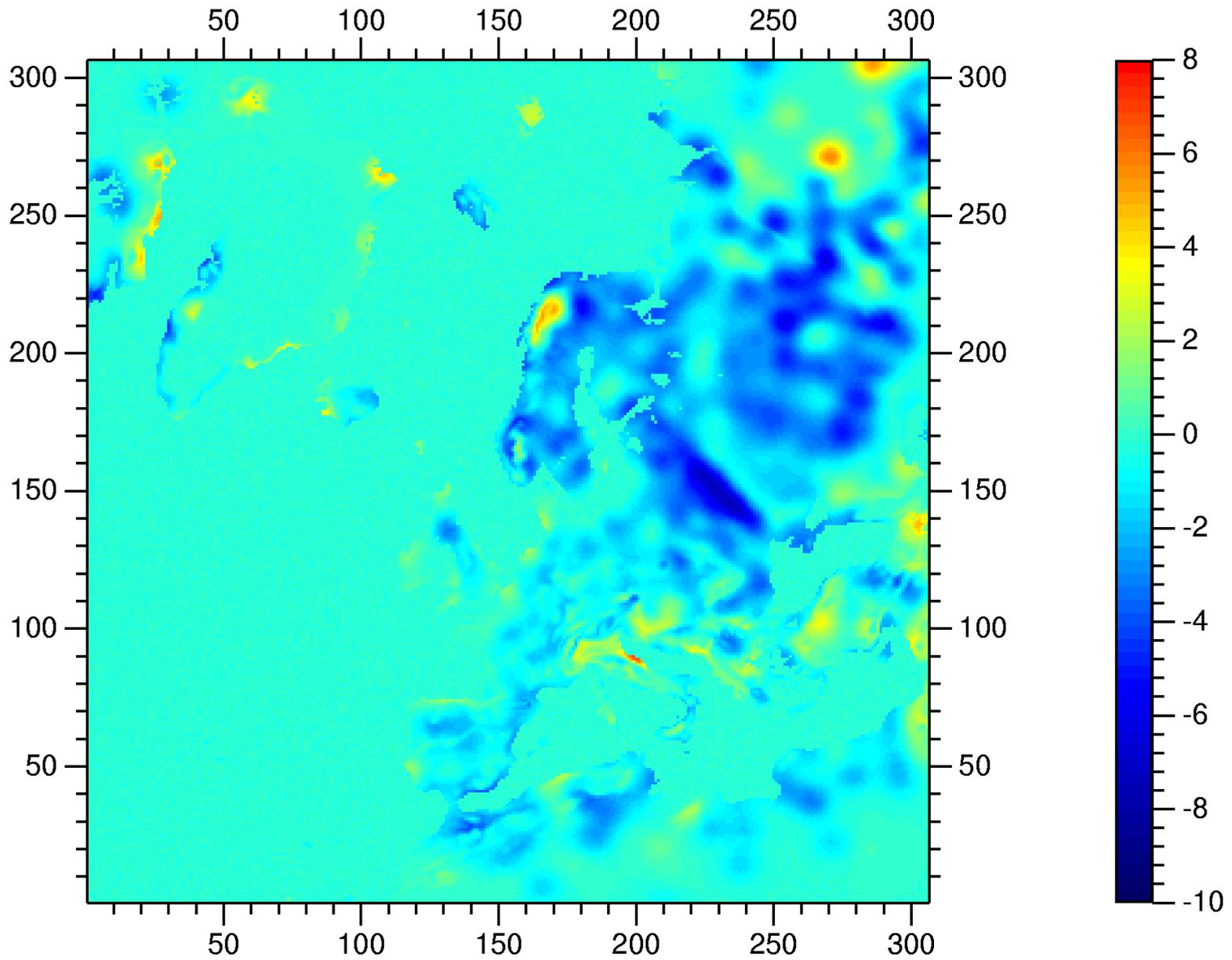
Modification of the analysis:

Run the physics 4 timesteps only including surface scheme and vertical diffusion (+ changes in lw-radiation due to different surface temperatures), starting from the analysed values.

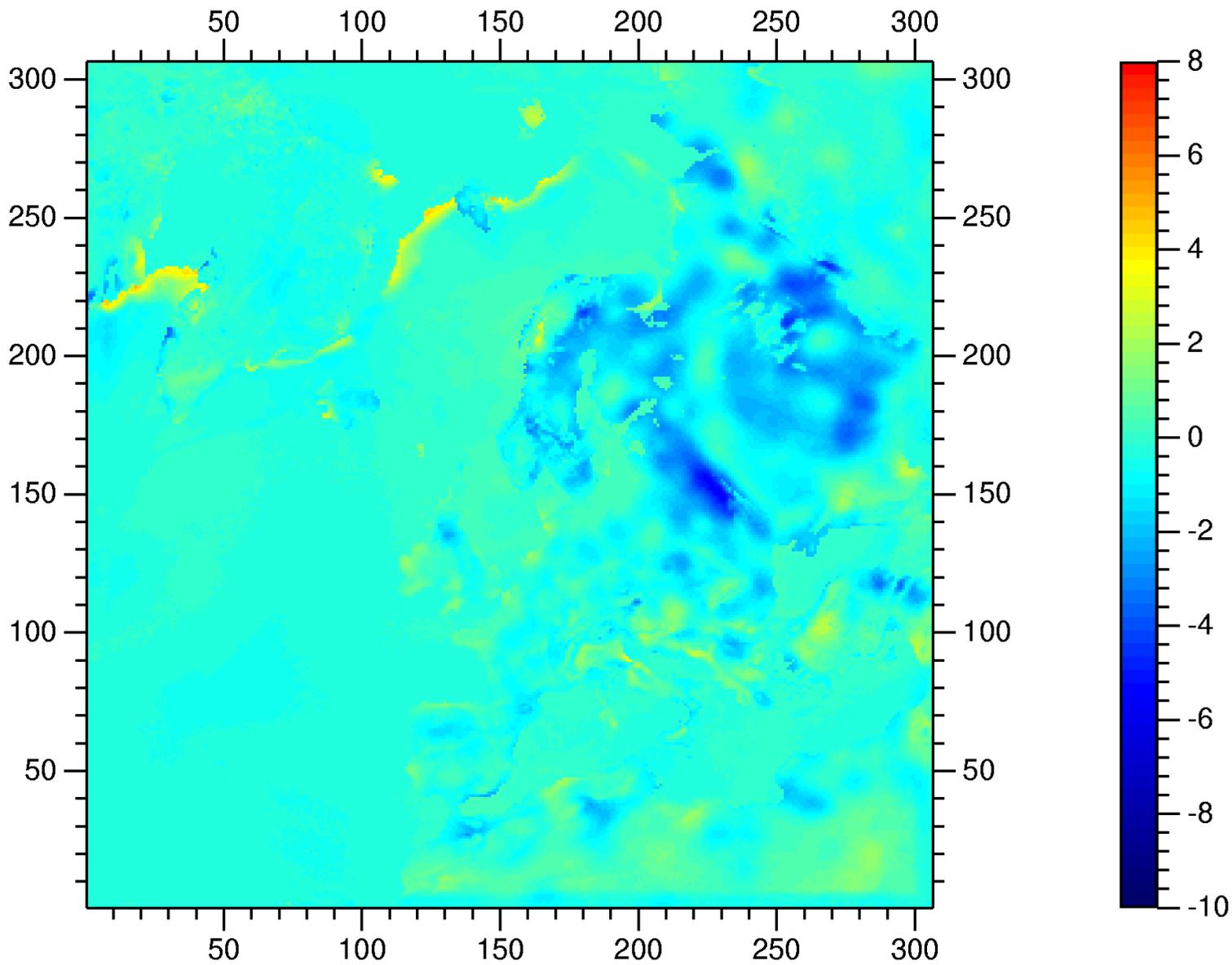
Perturb the surface temps, (reasonably distributed among the tiles) and calculate the numerical derivative of the T2m after adjustment of this perturbation.

Modify the points that after this manipulation give a smaller T2m-error than the initial error.

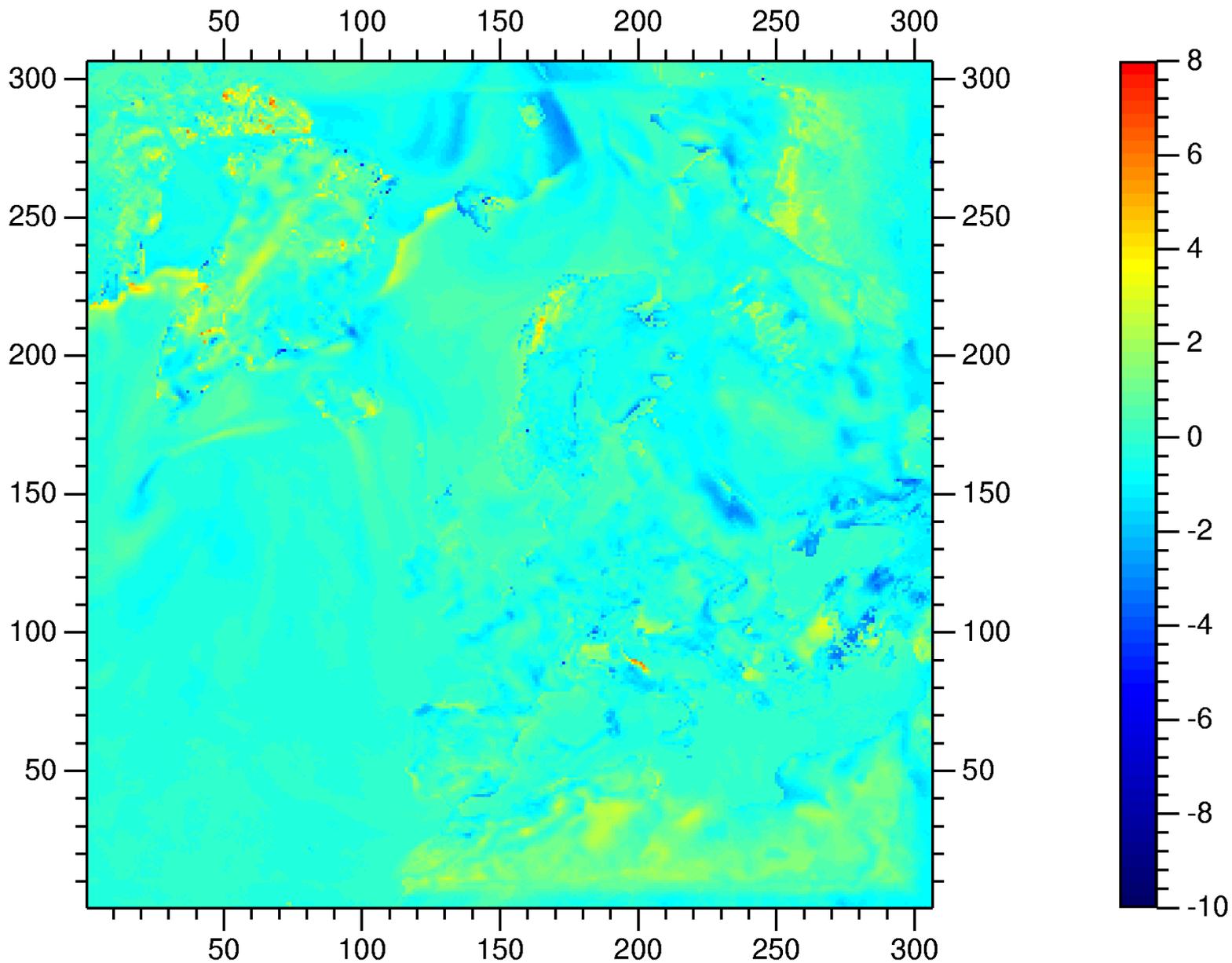
So far I have no results of also keeping the low atmosphere changes due to this adjustment (technical problems)



T2m first guess error (T2m first guess – T2m analysis)

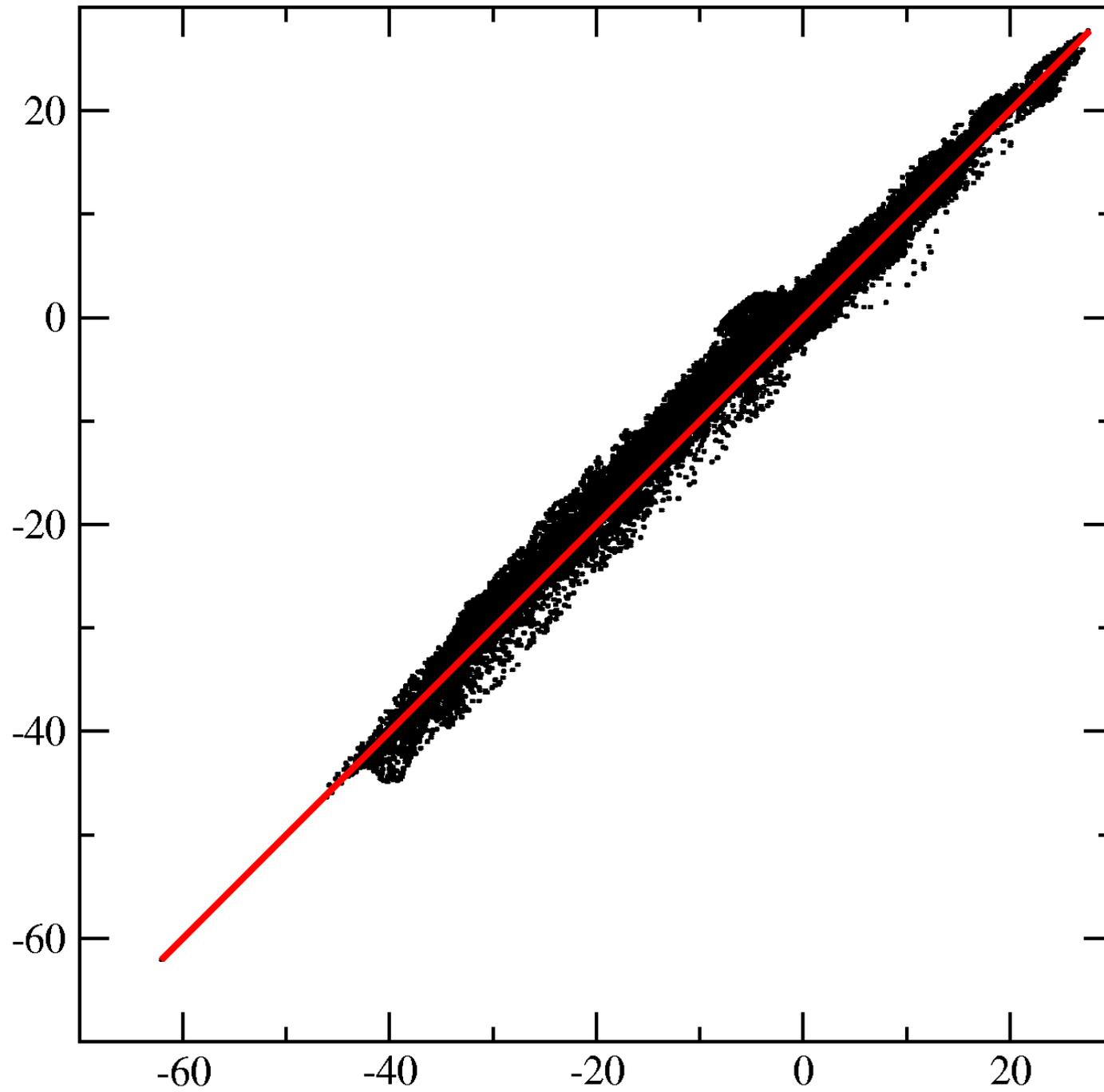


T2m after DFI -T2M analysis

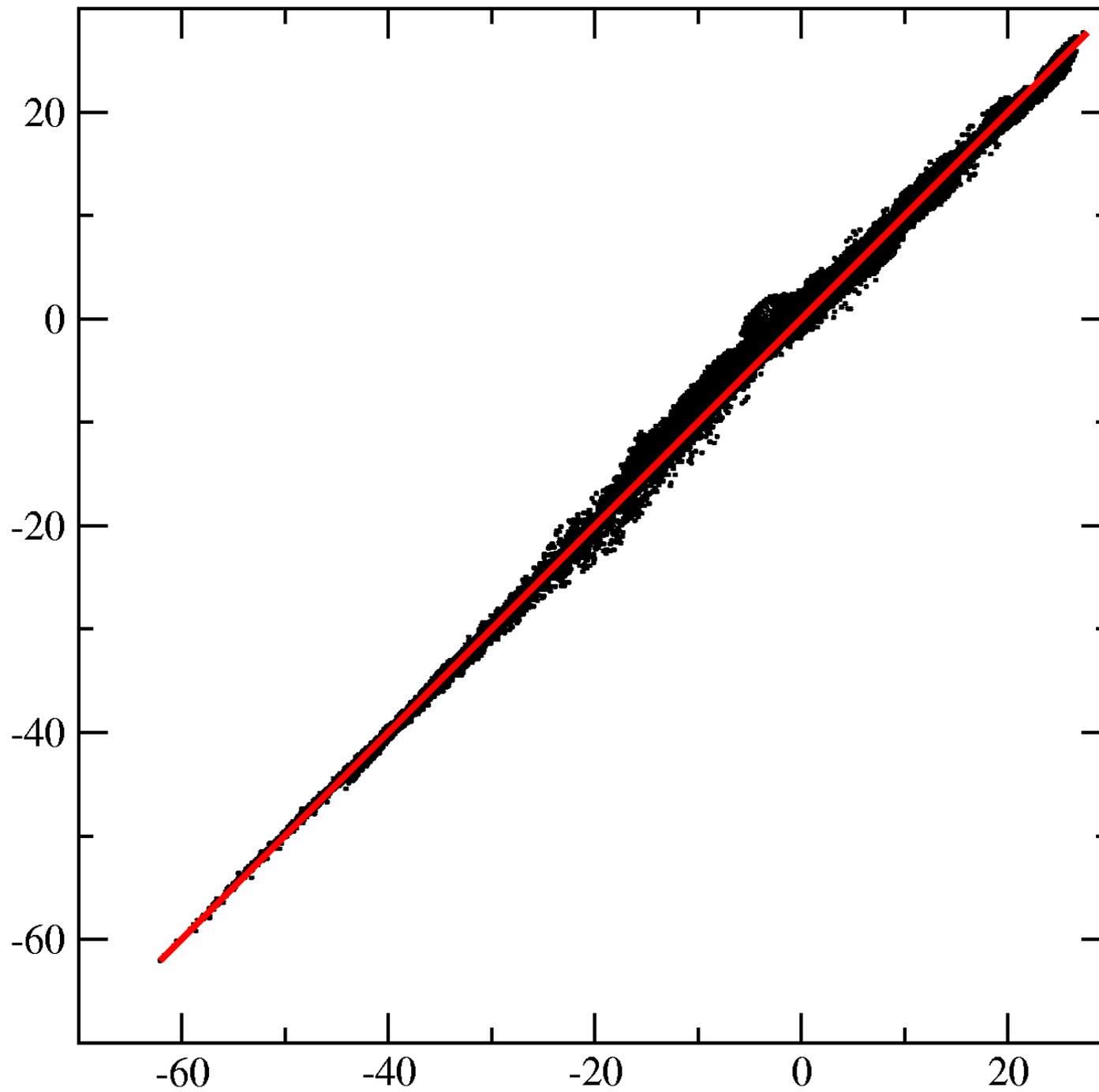


T2m after DFI (at +1H) after modification -T2m analysis

T2m first guess error



T2m error after DFI



T2m error modification after 4 timesteps

