The paper has been significantly improved. I nevertheless consider a few improvements are still necessary before it can be accepted for publication. I put my suggestions below. The first one bears on a point which has some importance, and which escaped my attention in my first review.

1. P. 15, l. 3, … $t_1 = t_0 + \Delta t$. Does it mean the assimilation was performed over only one timestep $\Delta t = 5$ minutes of the model ? If so, that reduces somewhat the interest of the experiment. It means that there is no propagation of information between grid-points, and that the adjustment of heat fluxes to observed temperatures is purely local. In addition, no significant convection can occur over the assimilation window, thus rendering inappropriate the explanation given p. 15, ll. 16-18 for the larger sensitivities seen in shallow areas on Fig. 1. Clarification of these points is desirable.

2. Since numerical values are given without units (and without elements for comparison) in the numerical experiments (Figure 1, parameter α on p. 15, l. 8), they are almost meaningless (and would not allow comparison with other experiments). It would be desirable to say more. In particular were SI units used in the numerical experiments ?

3. P. 9, l. 5. Since λ is defined in Eq. (5.2) as the minimizer of the function J, $J(v)$ would be more appropriate here (check for possible similar corrections elsewhere).

4. P. 4, l. 12, … *it contains all the available information*. That is vague. Can you be more precise ?

5. P. 15, l. 7, *a regularization parameter α, which appears near the term involving Q and $Q^{(0)}$* → … *parameter α, which weights the squared difference $|Q - Q^{(0)}|^2$*.

6. P. 14, l. 17, … *with zero initial condition* … I understand this means that the initial velocity was zero. But what about temperature ? What is uniform ?