Review of revised version
What controls the low ice number concentration in the upper troposphere?
by Zhou et al.

General comment:
The manuscript has improved in the revised version. However, some of my comments were not addressed sufficiently, thus I would suggest to consider these issues before the manuscript can be accepted. These issues are marginal and do not affect the whole qualitative and quantitative statements of the manuscript. Therefore, I recommend minor revisions, before the manuscript should be accepted.

Turbulence scheme:
As far as I understood the description of the scheme by Bretherton and Park (2009), it was developed for a better representation of the boundary layer. It is completely unclear how the scheme will behave in upper levels of the troposphere, since it was not developed for treating such thick layers in a much more stable environment. As far as I know, the behaviour of the scheme in the upper troposphere was not tested. Thus, the scheme might produce meaningful results but due to the wrong reasons. I understand that a detailed analysis of the scheme is beyond the scope of the manuscript, but I would like to see a more concrete statement about the uncertainty of the turbulence scheme.

WGARY:
I do not agree that the results from the WGARY parameterization in fig. 4(b) are convincing, since in the high temperature regime ($T > 210\,\mathrm{K}$) there is almost no variability. From this perspective it seems that the WGARY scheme is the weakest parameterization, especially because it is only depending on mean values of pressure, topography and latitude but does not take into account dynamic and convective instabilities, i.e .the actual state of the atmosphere.