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Geoscientific
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Discussions

Interactive comment on "Coupling a new turbulence parametrization to RegCM adds realistic stratocumulus clouds" *by* T. A. O'Brien et al.

Anonymous Referee #1

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General This paper describes the use of a more realistic turbulence parameterization scheme in a regional climate model to produce better results on the forecasting of stratocumulus clouds, which have significant contributions to the climate of the western coast of the America. The turbulence parameterization adopted is not new, but is based on the previous work with some minor changes. Better representation of the turbulence processes in the model contributing to improvement of climate forecast is also not surprising scientifically. However, the paper is generally well written and could serve as a good reference for other climatic modellers on the choice of the appropriate turbulence parameterization. As such, the paper is considered to be acceptable with minor revision.

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Major comments The improvement of turbulence parameterization scheme on the modelling of the diurnal and annual cycles of stratocumulus clouds is more understandable. However, it is not so sure about the physical reasons for improving the modelling of such clouds in interannual and decadal cycles. What contributes to the interannual and decadal cycles in the first place? When we know the responsible physical processes, then we could briefly discuss how the UW scheme contributes towards better representing such processes, and thus better modelling results could be obtained. Apart from the field experimental data, which are limited in spatial and temporal availability, it is suggested to compare the modelling results with other sources of data, such as SYNOP reports of cloud base and radiosonde measurements of boundary layer inversion strength, water vapour mixing in cloud top, cloud base height, inversion height, etc. The longer and routine availability of such data could serve to test the robustness of UW scheme for many years over larger areas.

Specific comments p.3446, line 13 and 14 – there are two “sources” Figures 6 to 8 – the diagrams are too small to be legible to the wearing eyes Are there any previous studies on the under-estimation of the modelled liquid water for similar turbulence parameterization scheme? More detailed discussion of this point would be welcome.

Interactive comment on Geosci. Model Dev. Discuss., 4, 3437, 2011.