



## ***Interactive comment on “Simulation of the microwave emission of multi-layered snowpacks using the dense media radiative transfer theory: the DMRT-ML model” by G. Picard et al.***

**Anonymous Referee #1**

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The work described in this paper presents some interesting aspects. However, in formulating their version of DMRT the authors seem not to be aware of two fundamental works by Tsang and his students: 1. L. Tsang, C. T. Chen, A. T. C. Chang, J. Guo, and K. H. Ding, “Dense media radiative transfer theory based on quasi crystalline approximation with application to passive microwave remote sensing of snow,” *Radio Sci.*, vol. 35, no. 3, pp. 731–749, May/Jun. 2000.

where the authors assure energy conservation in the QCA without the need of introducing the approximation of coherent potential (CP), and

2. D. Liang, X. Xu, L. Tsang, “The Effects of Layers in Dry Snow on Its Passive Mi-

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crowave Emissions Using Dense Media Radiative Transfer Theory Based on the Quasicrystalline Approximation (QCA/DMRT),” *IEEE Trans. Geosci. Remote Sensing*, Vol 46, pp. 3663-3671, 2008.

where the authors develop the multilayer versions of the model and show several simulations of snowpacks in various layering configurations. These papers are neither discussed in the introduction nor included in the references. The authors should clearly compare their approach (in particular the adoption of the empirical treatment suggested by Grody to overcome the limit imposed by the QCA-CP to big particles) with the rigorous solution developed in Paper 1, pointing out the advantages of their solution. Moreover: The results present a sensitivity analysis to various snow parameters but the effects of layering, which one would expect to find well described by a model focused on multi-layering, are completely disregarded. Several references are auto-citations and, in some cases, not the most appropriate (e.g. Picard Le Toan 2002 for the limits of the Conventional RTT, or Kerr and Njoku 1990 for the effect of atmosphere). When it is possible I recommend using original references. For example: Peake W.H *IRE Trans AP* 1959 for the relation emissivity-reflectivity. References to Books by Tsang and Kong (vol 2 and 3) should be checked. In conclusion, I recommend to clearly compare this work with the one described in papers 1 and 2, pointing out the achieved novelty and advantages of the selected approach. Also I would prefer that validation of model precede the sensitivity analysis

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