Response to the comments of reviewer 2 with regard to the discussion paper:

Mergili, M., Marchesini, I., Alvioli, M., Metz, M., Schneider-Muntau, B., Rossi, M., Guzzetti, F., 2014. A strategy for GIS-based 3-D slope stability modelling over large areas. Geoscientific Model Development Discussions 7, 5407–5445. doi:10.5194/gmdd-7-5407-2014.

The proposed paper introduces a) an open-source, multi-core processing application (r.slope.stability) on landslide susceptibility mapping over large areas capable of computing both FoS (factor of safety) and the probability of slope failure (Pf) parameters; b) the efficiency and fastness of this application compared to the single-core version (r.rotstab); c) parameterization strategies on field-measured and heterogeneous geotechnical and soil depth datasets; d) and how it affects the landslide susceptibility map (FoS and Pf) for shallow landslides of Collazzone area in Umbria. Each of these works contain novelties and therefore very valuable for the GMD community.

We would first like to thank the reviewer for the constructive comments on our paper. It is good to hear that, according to the reviewer, all aspects considered contain novelties and are valuable for the GMD community. Below we address each comment in detail. Our responses are given in bold blue letters.

Changes in the manuscript, compared to the initial submission, are highlighted in yellow colour.

However this wide range of topics makes difficult to maintain the focus of the paper. This should be the efficiency, fastness and accuracy of the multi-core processing algorithm.

Therefore more technical details on the hardware and comparisons should be provided on the different runs (e.g. in tabular form).

We have added information on the details of the hardware: we use a 48 cores (AMD Opteron, frequency of 2.2 GHz and cache of 512 KB) computer with 140 GB of RAM and running a 12.04 LTS Ubuntu GNU/Linux OS with the 3.5.0-26-generic kernel image. A new Table (Table 5) was introduced, summarizing the evaluation outcomes and the computation times of test 2 (Section 5.2).

More detailed evaluation/validation of the results on the test site compared to the earlier landslide susceptibility maps and the landslide inventory might help the reader to put the results in a broader context.

Earlier work in the Collazzone area, using statistical methods for computing landslide susceptibility, yields higher values of A_{ROC} (0.71 – 0.75, depending on the method, Rossi et al., 2010), whilst the susceptibility index introduced by Mergili et al. (2014) yields comparable values (0.68 – 0.70). Even though these results are not fully comparable due to different inventories and reference units

used, they indicate that the geotechnical parameters have to be better understood in order to make physically-based models superior to statistical ones. We have added these aspects to the discussion.

The input parameters are perfectly summarized in tabular form, the results of each sampling strategies (Sect. 5.2) should also be presented similarly with shorter discussion, helping the easier comparison and maintaining the focus of the paper.

We have added a table (Table 5) summarizing the results obtained with each tested combination of parameter settings to Sect. 5.2.

We did not find a lot of potential to shorten the discussion as (i) it was already condensed to the most essential issues in the initial version and (ii) there were some requests from the other reviewer to add additional aspects.