<u>Response to comments by Dr. J. Hofierka</u>

Item wise responses to comments by Dr. J. Hofierka are given below. We have also incorporated necessary corrections and additional explanations in the manuscript to address the comments made.

1. p. 260, line 26: Please explain how did you produce a "reference DEM". The contour data were used for interpolation by RST, while flat areas were interpolated by IDW? What you mean by (dense) "spot heights" in flat areas?

There are two data sources used to produce "reference DEM":

- Contour data of 5m interval mostly cover hilly areas. In this area we used RST interpolation.

- Spot heights: There are more than 190,000 elevation points cover whole area of Danang city. Data was field survey data collected by Danang city government.

In areas having only spot heights and no contour data, IDW method was used as RST was found to produce some negative values in the interpolated DEM. Both RST and IDW show similar RMSE comparing to reference data, 1.621m and 1.667m. However, it was also observed that the interpolated results using IDW show no negative elevation and match closely with reference data especially for low elevation areas and therefore we selected IDW for such area.

2. Did you merge 2 DEMs computed by these 2 different interpolation methods into one reference DEM?

Yes, IDW DEM for areas less than 10m elevation, and the RST DEM for areas with elevation more than 10m were merged as shown below to produce the reference DEM.

If(IDW_from_points>=10, RST_from_contour, IDW_from_point)

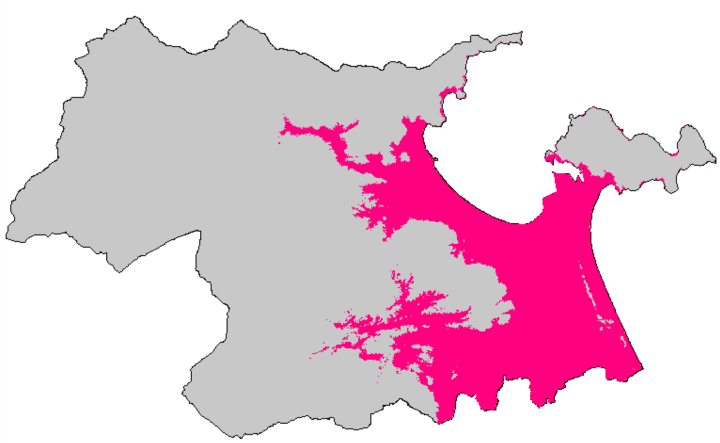

Figure 1:Red color area: IDW interpolated DEM from spot heights
Grey color area: RST interpolated DEM from contour lines

3. p. 266, line 13: Please explain what you did here: "Based on the above investigations, the elevation for GDEM and SRTM with respect to reference DEM were recalculated. The calculation was executed by r.mapcalc function in GRASS GIS software with the base map of land cover." Can you include a formula used in this calculation and explain how you used map algebra here?

Table 4 shows the elevation offsets of GDEM and SRTM on each land cover type. Using these offsets, we re-calculate the elevation for GDEM and SRTM with respect to reference DEM. The formula can be shows as follow:

GDEM_corrected = if(Landcover == 1, GDEM - 2.2, if(Landcover == 2, GDEM - 1.0, if(Landcover == 3, GDEM - 1.1, if(Landcover == 6, GDEM + 2, if(Landcover == 8, GDEM - 4.0))))))

SRTM_corrected = if(Landcover == 1, SRTM - 1.9, if(Landcover == 2, SRTM - 6.3, if(Landcover == 3, SRTM - 2.5, if(Landcover == 6, SRTM - 3.8, if(Landcover == 8, SRTM - 0.4))))))

Land cover type is coded as: 1- Agriculture, 2- Forest, 3-Built-up, 4-Bare land, 5-water. The map algebra used is only subtracting the offsets for each land cover type. Which has been explained in the manuscript.

4. The fusion algorithm presented on p. 268, eq. 1 might produce reasonable results for most applications, however, I doubt if this is sufficient for terrain analysis using 1^{st}order parameters such as slope and more importantly 2nd order parameters such as curvatures. Please include 2 color figures showing slope and surface curvature maps derived from the final fused DEM. This is also an issue raised by the referee X. Song("terraces").

We have included additional analysis and explanations in the "Result and discussion" section of the manuscript to address this comment. Results of analysis with new parameters, such angular difference between normal vectors, curvature and topographic roughness index for elevation surfaces of fused DEM and reference DEM have been added. Figure 16 in paper was removed and replace by the color maps of slope, profile curvature and tangential curvature maps extracted from fused DEM. New results with normal vector and roughness index are presented in tabular form (Table 7 and 8).