

## ***Interactive comment on “Cloudiness and snow cover in Alpine areas from MODIS products” by P. Da Ronco and C. De Michele***

**P. Da Ronco and C. De Michele**

pierfr7@msn.com

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Referee comment: **In step 3 you consider 4 different aspect classes during the calculation of the regional snow and land lines. I agree that aspect strongly controls the snowmelt locally, but you claimed the approach to be regional, and you use the whole basin, which is characterized by very different landscapes, in all the other steps. Don't you think that the aspect subdivision turns your approach to a different level of detail as regards meteo and morphologic conditions?**

Author response: Here, we present four pictures (for 2004, 2005, 2008, 2009 respectively) where it is shown the daily average altitude of both regional snow and land lines, from January to the end of May, having distinguished pixels in two classes of aspect:

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North and South. North class includes pixels with  $aspect > 315^\circ$  or  $aspect < 45^\circ$ , while South class pixels having  $135^\circ < aspect < 225^\circ$ ). Daily average altitudes are computed only for days with less than 50% cloud cover using output maps of step 2 of the cloud removal procedure. From these figures, it is possible to see that 1) the snow line of south class stands consistently above that of north class for each year. Except for days with extensive snowfalls within the basin (which pull down the snow lines uniformly), the snow line altitude increases during the melting season and the south class maintains higher values for all the study period (2003 - 2012). 2) the elevation differences between the two snow lines (north and south) can be quantified in the order of 250 m. As expected, such differences are less pronounced for the land line, which is mainly dominated by the great number of pixels at low altitudes covering the Po Valley. 3) the two land lines are basically coincident except for some melting days located in the accumulation season.

These figures illustrate that the impact of the aspect on the snow cover is evident even at regional scale, thus a regional snow line approach which considers exposure improves the representation of topographic effects on snow distribution. Since aspect values can be derived directly from the DEM, the step 3 of the procedure introduces an improvement without any requirement of additional information and it seems now definitely justified.

Finally, we argue that the scale of the cloud removal procedure is not the whole basin but the 500 m pixel for all the other steps. In fact, each temporal filter involved works at the pixel scale. Thus, the strategy of considering snow/land line per aspect classes does not seem contradictory with the spatial scale of reference for the other steps.

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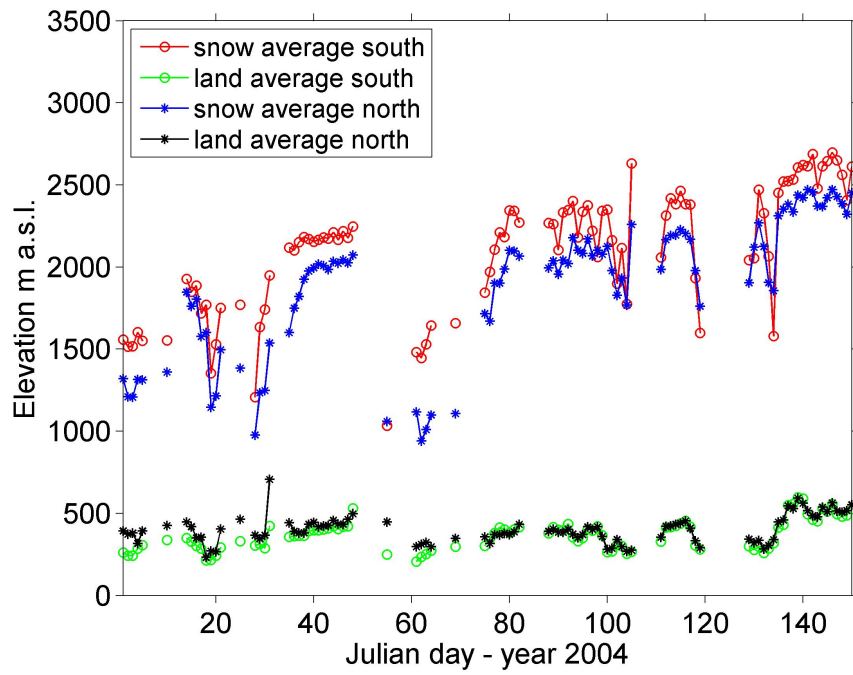


Fig. 1.

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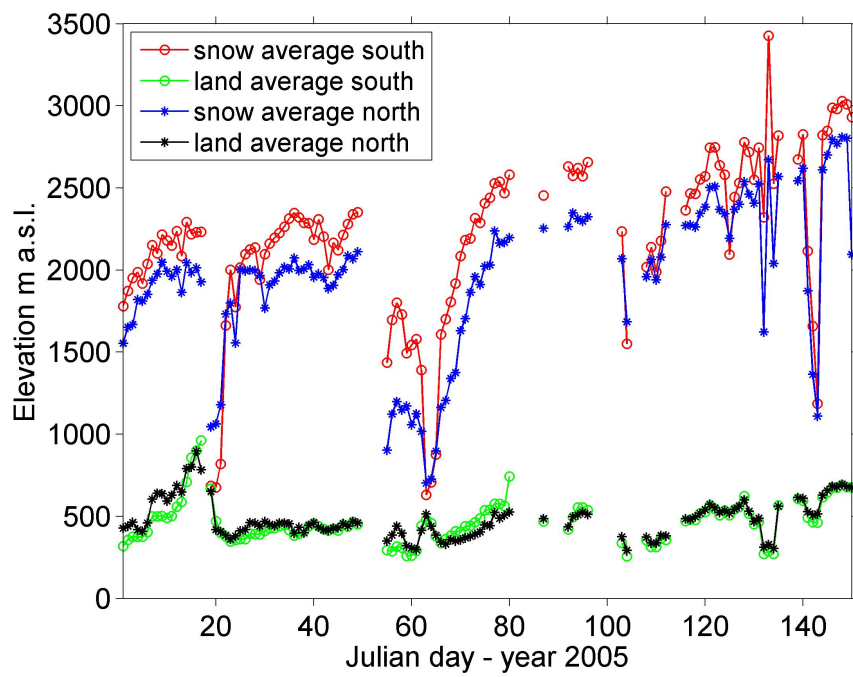


Fig. 2.

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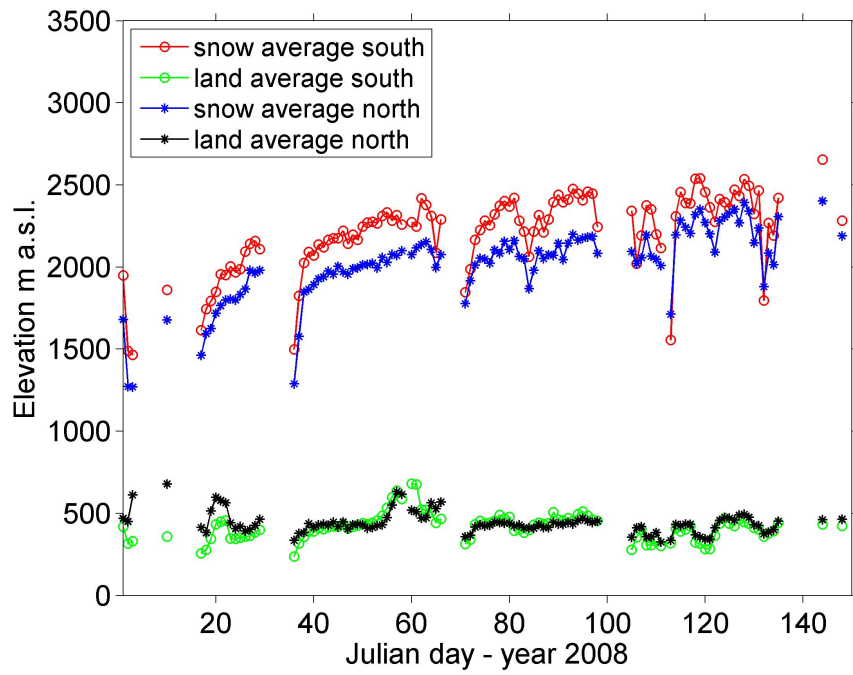


Fig. 3.

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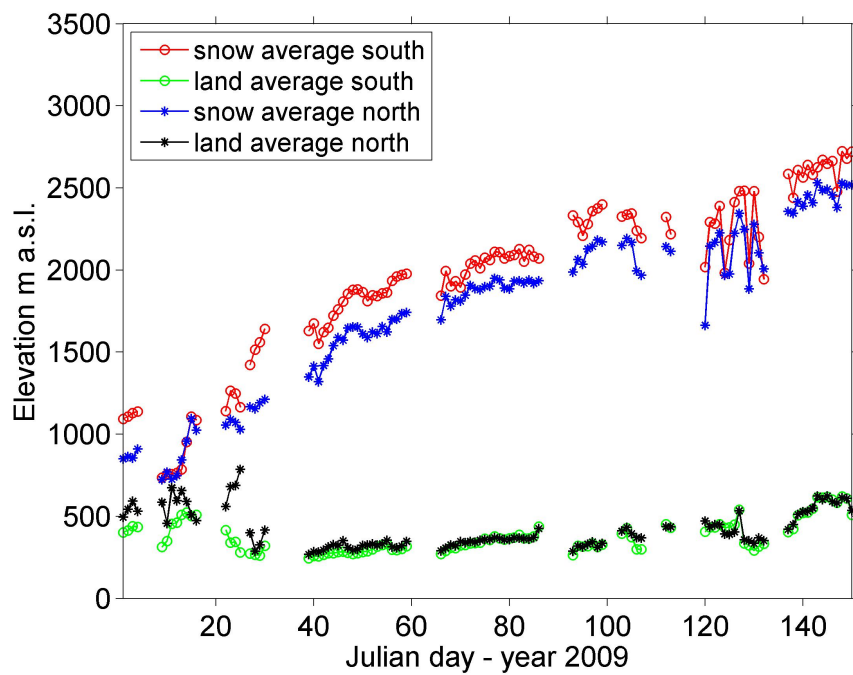


Fig. 4.

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