Interactive comment on "Theia Snow collection: high resolution operational snow cover maps from Sentinel-2 and Landsat-8 data" *by* Simon Gascoin et al.

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This paper appears to be quite intriguing. However, in order to review it, I want to access some of the results, but I am not able to create an account at https://theia.cnes.fr/. At this point, my comments are rather sparse, but I would be willing to review the paper again if this problem with creating an account can be rectified.

For the world's mountains, the "cirrus" band — Landsat 8 OLI (band 9), MODIS (band 26), or Sentinel-2 (band 10) — produces problematic output. The idea is that the wavelengths in this band are in a region of strong absorption by atmospheric water vapor, so that anything with high reflectance is likely a cirrus cloud. However, much of

the snow of interest is at high elevation! In some areas of the world, for example, the Himalaya, almost all the snow is misclassified as cirrus in the Landsat 8 BQA file.

One of the other referees has stated that the Theia archive mostly consistes of Sentinel-2A/B products, with little representation of Landsat 8 data. This is a shame, as the combination of the two systems provides imagery with a high temporal resolution.

In this context, there is no discussion of the CFMask for Landsat 8. References to consider are: Foga, S., Scaramuzza, P. L., Guo, S., Zhu, Z., Dilley Jr, R. D., Beckmann, T., Schmidt, G. L., Dwyer, J. L., Hughes, M. J., and Laue, B.: Cloud detection algorithm comparison and validation for operational Landsat data products, Remote Sensing of Environment, 194, 379-390, doi 10.1016/j.rse.2017.03.026, 2017. Zhu, Z., Wang, S., and Woodcock, C. E.: Improvement and expansion of the Fmask algorithm: cloud, cloud shadow, and snow detection for Landsats 4-7, 8, and Sentinel 2 images, Remote Sensing of Environment, 159, 269-277, doi 10.1016/j.rse.2014.12.014, 2015.

In our experience, some clouds have Landsat 8 OLI signatures that can be similar to some snow, for example thin cirrus clouds compared to fractional snow. Moreover, Selkowitz et al. have shown that in mountainous regions, the majority of Landsat snow pixels are not fully snow covered at 30 m resolution. Reference to consider is: Selkowitz, D. J., Forster, R. R., and Caldwell, M. K.: Prevalence of pure versus mixed snow cover pixels across spatial resolutions in alpine environments, Remote Sensing, 6, 12478-12508, doi 10.3390/rs61212478, 2014.

As mentioned previously, I can take a closer look when I can get acess to Theia.