

## ***Interactive comment on “The global forest above-ground biomass pool for 2010 estimated from high-resolution satellite observations” by Maurizio Santoro et al.***

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Thanks for an interesting manuscript. Very important work.

Noting the importance of the L-band SAR data in the development of the above-ground biomass map, I'd be interested to know the authors' (or any other experts) opinion on how data from current and near-future L-band SAR missions could be further enhanced to better accommodate information extraction for this kind of applications.

We know that increased temporal revisit is of key importance to mitigate seasonal and weather-related effects affecting the data. That parameter is also well acknowledged

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by space agencies and addressed in near-future missions (e.g. NISAR).

When it comes to polarisation, today's SAR missions are not taking advantage of the full SAR capacity. It is widely known that both the co-pol and the cross-pol channels provide critical and complementary information about vegetation structure, which is why co/cross-pol is the preferred dual-pol (DP) mode for today's key missions such (PALSAR/PALSAR-2 and even Sentinel-1). But does DP provide the whole picture?

I'd be interested in hearing some opinions on the actual usefulness of fully polarimetric (qual-pol, QP) L-band data for applications related to forest and biomass. QP data provides detailed information about the scattering mechanisms, which is potentially of great relevance for vegetation biophysical parameter retrieval. It also accommodates corrections for Faraday rotation. It is however notable that also forthcoming missions such as NISAR and ROSE-L have ditched QP in favour for DP only. While DP was a given choice in the ALOS/ALOS-2 era, where the the narrow QP swath width was a major constraint that in practice prevented systematic global observation at QP, it is not necessarily the case for the next generation missions. Although the QP swath width still is typically half of that for DP (hence influencing the effective temporal revisit frequency), the next generation missions all operate with very large swaths that would allow systematic QP acquisitions with monthly repeat (e.g. 28 days in the case of ALOS-4).

So coming back to my question – would global/regional Pol-SAR/Pol-InSAR observations bring any new information of relevance for forest structure and biomass measurements? Or are the advantages so marginal that QP would simply be considered a waste of satellite resources? Any thoughts?

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