

Review of the Ph.D. dissertation presented by **Addo Koranteng** on

Assessment of forest cover and land use change in Ghana as part of monitoring system in REDD mechanism

The overall context of the previous review will not be iterated here and the focus is on changes in regard to the recommendations made. The structure of the dissertation has changed accordingly, i.e. the research questions are provided earlier in the dissertations and help the reader to better comprehend the context of this research. Also several of the points raised have been picked up (e.g. the number of research questions is reduced, recent literature included, some limitations included).

The overall standard of the dissertation, though, has not been considerably improved. New sections do often not hold what they promise from their headings. To exemplify this along section 2.5: Most of 2.5.3 is not on LULCC detection. 2.5.4 is a mix between LULCC methods and systems. Studies are cited from the broad body of literature without a recognizable strategy and only few relate to REDD or to the research questions raised. Major achievements on generic LULCC classification systematics are on the other hand not mentioned (e.g. the LCCS by FAO). It appears that much is cited from software handbooks. 2.5.5 (“Prognosis in Forestry”) is not on prognosis at all.

Most importantly, the methods are still not appropriately described and most crucial steps are not elaborated. The thesis contains ca. 1,5 pages on pre-processing, 1,5 pages on the classification, and 0,5 pages, respectively, on accuracy assessment, change analysis and scenarios (erroneously named “Prognosis”). Why this methodology? How were the training and validation points spatially distributed and what was the reasoning for choosing exactly those (number, distribution, stratification)? No area estimates are calculated either (see Olofsson et al. 2014). Why Markov chains? How could the drivers of change be factored in, even in a simplistic approach? In 5.3 Addo Koranteng names several potential reasons for deforestation in Ghana – but has not taken any of those into account when “predicting” those changes (scenario building would have been the right term). Overall, I suppose that at least 20% of the 118 pages of continuous text should have been dedicated to the methods section to describe the workflow properly, including the reasoning for the methods, data and meta-data descriptions and the specific settings used in each step.

Accordingly, the visual inspection of the maps (even at the broad scale provided) contradicts the given accuracies in the results section. Input image quality is deficient, mostly due to clouds (as also stated by the author) and while this is not the author’s responsibility, Addo Koranteng does not discuss this in depth and does not infer limitations from the data quality

issue (apart from the very broad ones in the end of the dissertation that are only listed and not discussed). For example, comparing figures 4.20 and 4.24 illustrates that even the forest class, which is the simplest of all the classes to map, is not depicted properly. This error propagates directly into the change analysis and aggravates as errors from two images are combined. This is similar for both test areas. If close-up figures from the test areas were provided, this would have been even more obvious.

It is apparent that modeling from such input data cannot be valid either. Using the 2010 data for “validation” in the scenario building is not an option. This is clear from the maps as well as from the (over-optimistic) statistics. Comparing the results to the maps of Hansen et al. 2013 exemplifies this. Even the global mapping product by Hansen et al. (2013) seems clearly more accurate than the regional maps presented here. The statement “The statistics was very satisfactory and the accuracy very high” (p 102) is in my perspective not true. The author should have presented quantitative comparisons with other studies to prove this statement. I therefore also disagree on “The land use/cover classification for the AOI is very consistence with studies conducted by other researches such as (Hansen et al., 2013; Kim et al., 2014; Sexton et al., 2013; Townshend et al., 2012).”

Finally, the discussion is mostly not really discussing the presented work. It still stays superficial and generic. It is contradictive to state on the one hand that the pre-processing is of prime importance for such studies, while on the other hand in the methods section it is merely described that geometric and radiometric pre-processing was performed; relevant details on methods, control points (number, distribution, results), radiometric correction methods, or correction settings during radiometric processing, etc. are not given. Further, some of the sentences simply do not make sense, e.g. “One or more strata selected are estimated to be main drivers of the system under observation.” (p 101). It is impossible to judge if this is due to the inappropriate language or if this is due to a general mis-understanding by the author.

While I can sense that Addo Koranteng tried to relate to the previously raised, critical points, the major shortcoming of his dissertation (still) is that he has not adopted the state-of-the-art and more often than not only lists papers instead of inferring a clear scientific strategy from the cited literature. The lack of methods description is the most obvious drawback, but results and discussion are also not adequately elaborated.

Summarizing, the written work still reveals major deficits and I hence **cannot recommend accepting** Addo Koranteng’s thesis at the prestigious Faculty of Forestry at Warsaw University of Life Sciences.

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