General changes to the manuscript (essd-2016-33)

In addition to comparing BSWB v2016 with the previous BSWB v2011 (Section 5), we included a comparison with independent remote-sensing based estimates of terrestrial water storage from GRACE (Gravity Recovery and Climate Experiment). These results show good agreement between the two datasets, with mean correlations for the time series of absolute values and of their anomalies of 0.7 and 0.51 respectively. A short section on this comparison and a figure (see Fig. 1 below) documenting it has been added (new Section 6):

"The BSWB v2016 dataset is also compared with independent remote-sensing based estimates of TWS from GRACE (Tapley et al., 2004). We use the Jet Propulsion Laboratory (JPL)-RL05MGRACE mascon (mass concentration blocks) solution providing equivalent water thickness with a spatial sampling of 0.5x0.5 (doi:10.5067/TEMSC-OCL05; Watkins et al., 2015). The BSWB v2016 drift-corrected monthly variations in TWS have been temporally integrated for the comparison with GRACE (see also Section 4.2). Figure 6 displays the distributions of the time series correlations between BSWB v2016 and GRACE for the absolute values as well as for their anomalies (i.e., anomalies with respect to the mean seasonal cycle) as box-percentile plots (Esty and Banfield, 2003). Basins with at least four overlapping years of data and with at least nine years for the calculation of the mean seasonal cycle are considered. The analysis is done separately for all basin sizes as well as for basins larger than 10^5 km^2. The two datasets mostly agree well, with slightly higher correlations for the larger basins. Mean correlations amount to 0.7 for the absolute values and 0.51 for the anomalies."
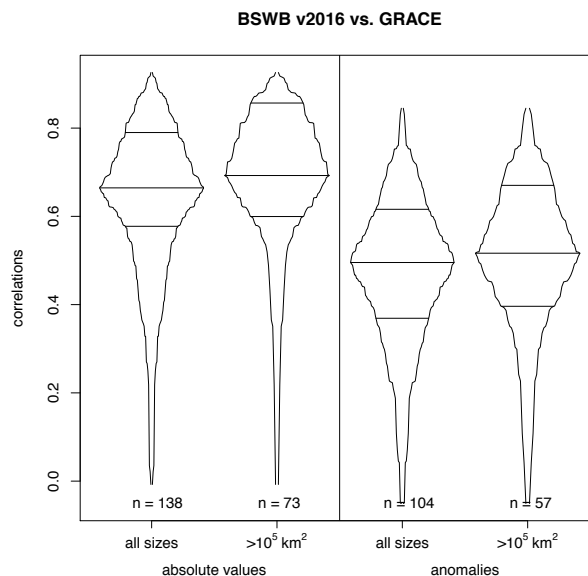

Figure 1. Box-percentile plot showing the distributions of the correlations between BSWB v2016 and GRACE time series for absolute values and for their anomalies with respect to the mean seasonal cycle. Basins with at least four overlapping years of data and with at least nine years for the calculation of the mean seasonal cycle are considered, with resulting number of basins denoted in the plot. The distributions are displayed for all basin sizes as well as for basins larger than 10^5 km^2. The width of the box at any given height is proportional to the percent of observations that are more extreme in that direction. The median, 25th and 75th percentiles are marked with line segments across the box.

The BSWB vs. GRACE comparison is also mentioned in the Conclusions:
"It also compares well with independent remote-sensing based estimates of TWS"

Also, note that the doi of the dataset has changed (doi:10.5905/ethz-1007-82) as we re-submitted a new data package including the format corrections asked for by Referee #1.

References:

Esty, W. and Banfield, J.: The Box-Percentile Plot, Journal of Statistical Software, 8, 1–14, doi:10.18637/jss.v008.i17, 2003.

Watkins, M. M., Wiese, D. N., Yuan, D.-N., Boening, C., and Landerer, F.W.: Improved methods for observing Earth's time variable mass distribution with GRACE using spherical cap mascons, Journal of Geophysical Research, 120, 2648–2671, doi:10.1002/2014JB011547, 2015.