(H3) Finally, we expect that selection towards more restrict functional traits values may lead to a scenario of communities with lower functional richness (Cornwell et al., 2006; Funk et al., 2017; Kleidon, Adams, Pavlick, & Reu, 2009; Perronne & Gaba, 2017). The restriction on functional trait values would decrease evenness, as the density of traits values would be less regularly distributed, showing an expected lower utilization of the functional space (De La Riva et al., 2017; Hillebrand et al., 2008; Mason, Mouillot, Lee, & Wilson, 2005; Mouillot et al., 2011)⁠. Beyond that, this restricted occurrence of traits values due to the imposed extreme conditions might be pushed towards more extreme regions of the functional space, yielding an increase in divergence. since this functional diversity component can demonstrate if the frequency distribution of trait values in the functional space maximizes the total community variation in functional characters (Mason et al., 2005)⁠ and also if different strategies are able to deal with new conditions (Funk et al., 2017)⁠.

*Reduced precipitation impacts on functional diversity facets*

The above-cited changes drove alterations in the three facets of functional diversity within the two employed modeling approaches (Fig. 5; Table XX). Contrasting to our predictions in H3 that the applied precipitation reduction would decrease the richness of trait variation in the communities, we found an increase in functional richness for all traits in both approaches (Fig. 5a), except for residence time in PFTA. Also, the percentage of change in this facet was much higher in TBA, for example, while the TBA presented an increase of 15.15% in richness for leaf allocation, PFTA showed an increase of only 0.47% for the same variable. For all the traits in the TBA, we observed an increase superior to 100% for functional evenness facet, while in the PFTA, the result was the opposite: traits showed a decrease in this functional diversity component, except for allocation and residence time in AGBW (Fig. 5b). The evenness result for TBA differ from our assumptions pointed out in H3 that this functional diversity facet would decrease because of the expected selection of a narrow range of trait values. In line with richness, the change in evenness for the PFTA traits was in a much lower degree of change (74% maximum) when compared to TBA. While leaf allocation displayed an increase of more than 200% for functional divergence, the other TBA traits presented reduction in this variable, contrary to our H3 (Fig. 5c). Divergence in the PFTA presented an increase in its functional traits but leaf allocation and residence time in ABGW (Fig. 5c). As the other functional diversity facets, the changes observed for PFTA was in a smaller magnitude than for TBA.

Also, with the applied change in precipitation, the hypervolumes for TBA and PFTA showed a pronounced change (Figure 4; see movie SM.1 for a 3D animated representation): under natural climatic conditions the size of the volume that the data occupy was equal to 1.711 and 0.007 for TBA and PFTA, respectively; while under reduced precipitation the volume size increased for both approaches: 47.837 for the former and 0.755 for the latter. This result reinforces the refutation of our second hypothesis. The overlap degree between hypervolumes (before and after the drought scenario) yielded a value of 0.038 for the TBA and of 0.009 for the PFTA, indicating almost no similarity between the hypervolumes. Finally, the distance between the centroids of the two hypervolumes after imposing a climatic change indicated a change in the mean values: the centroid distance for the TBA was 5.25 and 0.937 for the PFTA, that is, the mean values were modified to a higher magnitude for the former approach.