The Gravity Recovery and Climate Experiment (GRACE) satellite mission is now in orbit for 9 years. The long time span of GRACE observations allows detecting small secular trends as well as long-periodic signals in mass variations. In our study, we investigate possible permafrost changes in Central Yakutia in Siberia, Russia, using GRACE monthly solutions. The observed mass changes indicate long-term hydrological changes in the large Siberian watersheds. In order to explain the observed mass variations, we evaluate different hydrological parameters such as the lake surface extent and the active layer formation. Analysis of multi-spectral satellite images shows a significant increase in the lake surface area. This is linked to a strong wetting trend in this region. As consequence of an increase in precipitation, thermokarst depressions were filled with water. However, the increase in the lake surface can only explain about 20% of the mass increase. A large potential of the water storage can be attributed to sub-surface processes related to changes in the active layer depth. Central Yakutia experiences a strong warming trend. The warming increases the thawing depth of the permafrost and thus affects the active layer formation and the sub-surface water storage capacity. We also discuss possible other reasons for the remaining mass variations such as talik formation in the permafrost regime.