Seasonal variations in the station ranging bias and tropospheric zenith delay in SLR

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Changes of the surface mass loading deform the Earth's surface and cause a modulation of mass loading center, and also produce an additional loading potential acting on satellite. In all of studies, the SLR observations are assumed to only contain a constant or pricewise systematic station dependent bias. However, a significant seasonal signal appearing in station ranging bias was observed for most tracking stations in the global SLR network. A large part of the seasonal signal in raging bias could be produced by the degree one loading potential affecting on satellite, and a small part is due to the high degree surface mass loading induced variation. The monthly solution of geocenter parameters become comparable with the solution from the GPS based global conversion when the ranging biases are simultaneously estimated for the tracking stations. The effects of the error in the modeling of tropospheric zenith delay and gradients are negligible effect on estimating of the geocenter variations and can be separated from ranging bias.