

# ESTIMATION OF THE ELASTICITY EARTH PARAMETERS $K_2$ $K_3$ FROM THE SLR TECHNIQUE

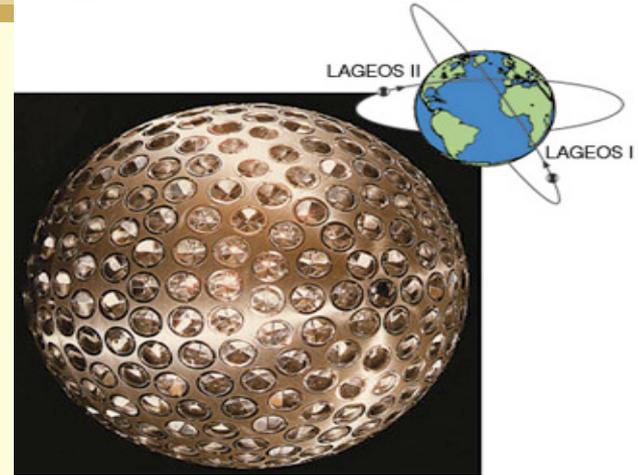
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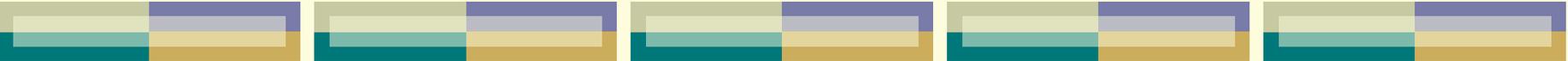
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# Measurement Data



The study is based on satellite observations taken by the global network of the ground stations during the period from January 1, 2005 until January 1, 2007 for monthly orbital arcs of LAGEOS1 and LAGEOS2 satellites. Total were used 145000 normal points.

The solutions were produced employing the program GEODYN II  
NASA/GSFC (Eddy et al.,1990)

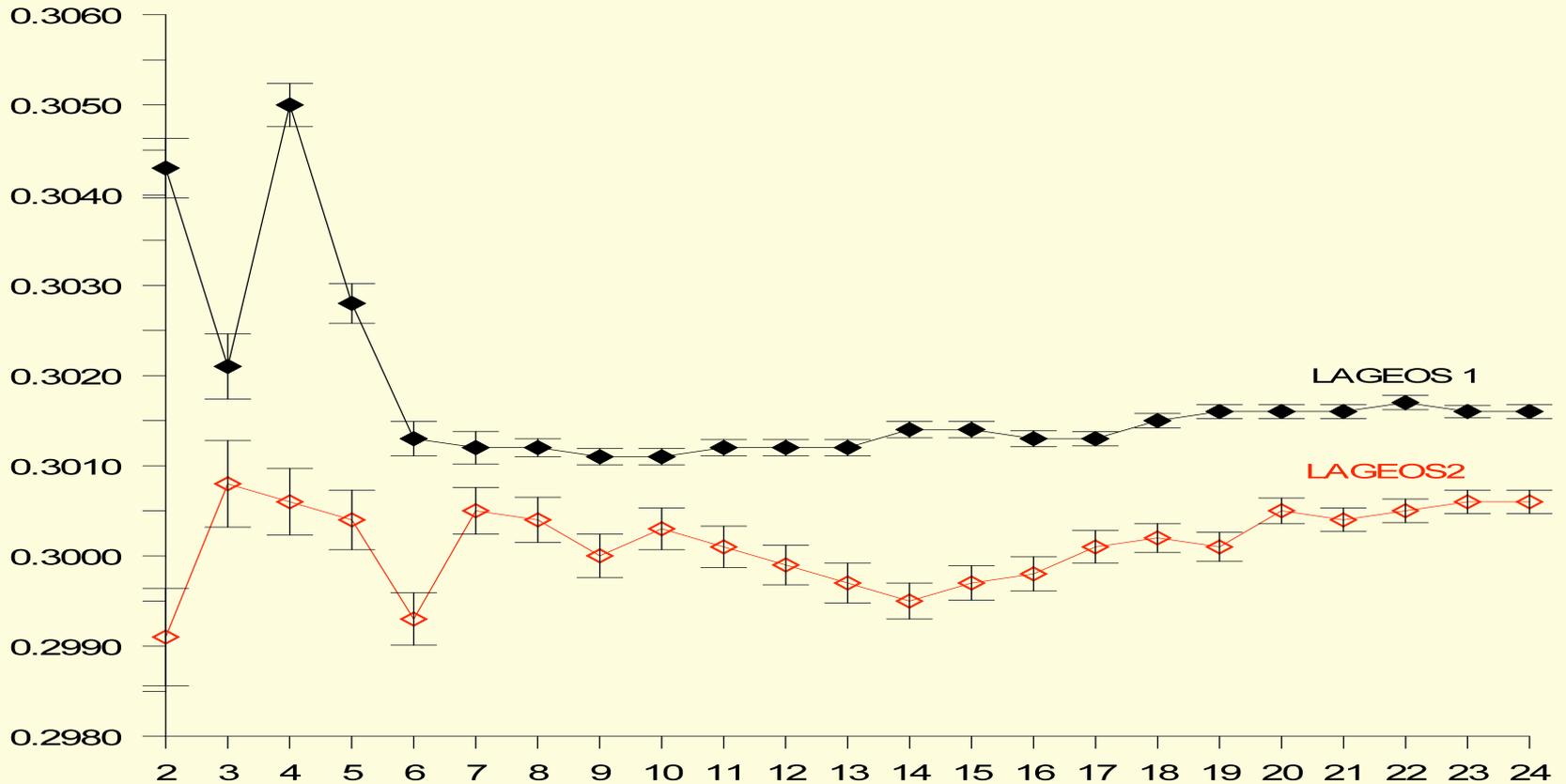


The global elastic parameters  $k_2$  and  $k_3$  (Love numbers) associated with the tidal variations of the satellite motion are estimated for 24 months time intervals. The sequential method was adopted for analysis. In the first step, the elastic parameters were adjusted for two orbital arcs. In the next steps, arcs one after the other were included using sequential method. In the each step, the parameters were adjusted once again. The results of analysis are shown for  $k_2$  and  $k_3$  separately.



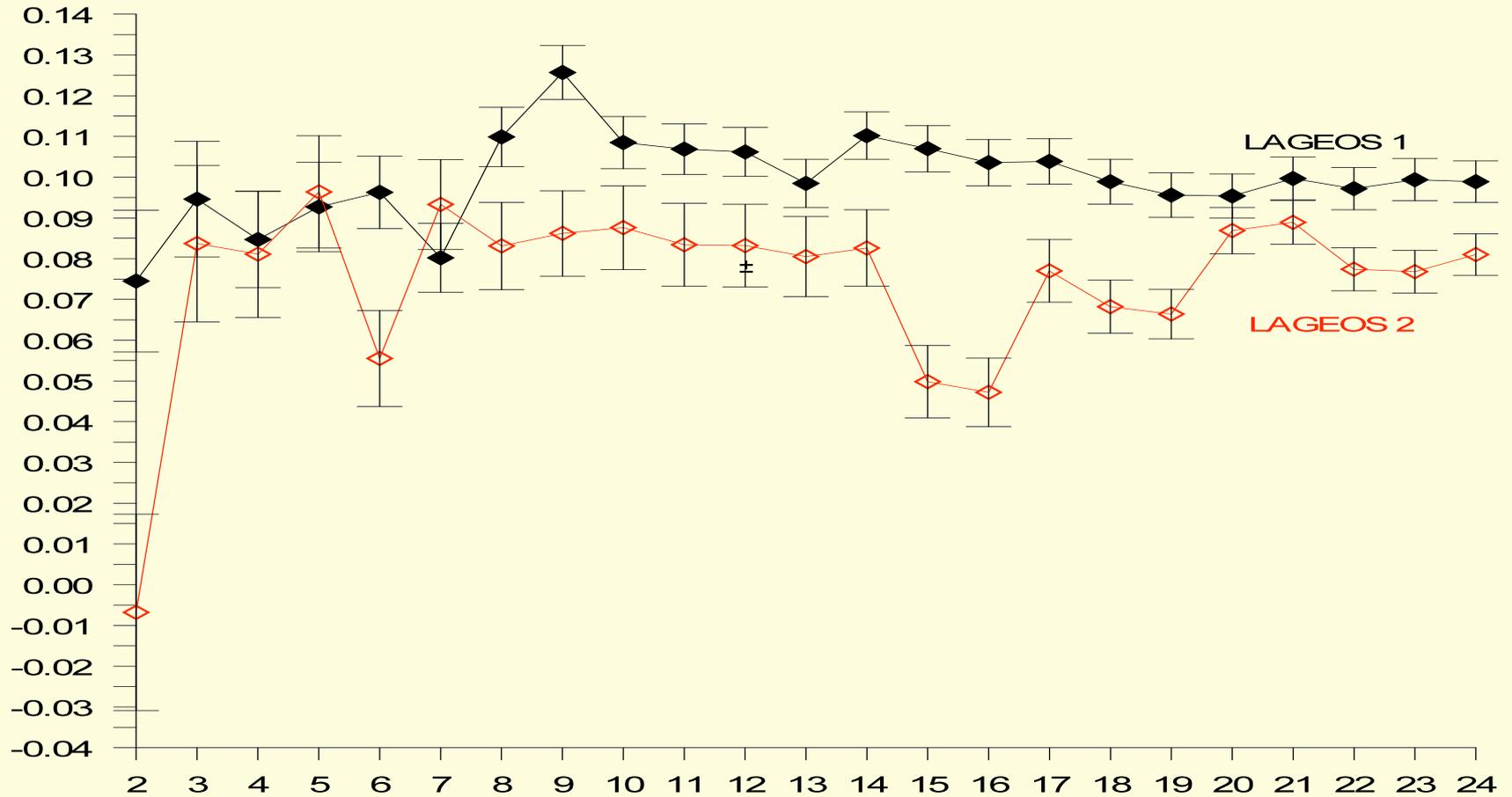
Love number  $k_2$  estimated from Lageos1 data equal to  $0.30160 \pm 0.00008$

and Lageos2 data equal to  $0.30068 \pm 0.00013$



Love number  $k_3$  estimated from Lageos1 data equal to  $0.0989 \pm 0.0051$

and Lageos2 data equal to  $0.0810 \pm 0.0051$ .





On the basis of the computations performed it can be concluded that:

- The estimated parameter Love number  $k_2$  is equal to  $(0.30160 \pm 0.00008$  and  $0.30068 \pm 0.00013)$  for LAGEOS1 and LAGEOS2 tracking data separately. The agreement of estimated parameters for both satellites can be seen. Difference is at the level 0.3%.
  - The estimated Love number  $k_3$  is equal to  $(0.0989 \pm 0.0051$  and  $0.0810 \pm 0.0051)$  for LAGEOS1 and LAGEOS2 tracking data separately. Difference is equal to 0.0179 it means at the level 20% value . Discrepancy with nominal value agree with estimation by Longman (0.93) described in (P.Melchior,1978) is equal to 5%.
  - Stability of estimated elasticity Earth parameter  $k_2$  and their errors became visible for about 23-month time interval (Fig.3). But for  $k_3$  , 24-month time interval not allows to obtain stability of solution what is shown in (Fig.4)
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