

Estimation of the Sea Level Rise Around Sri Lanka with Twenty Years of Altimetry Data

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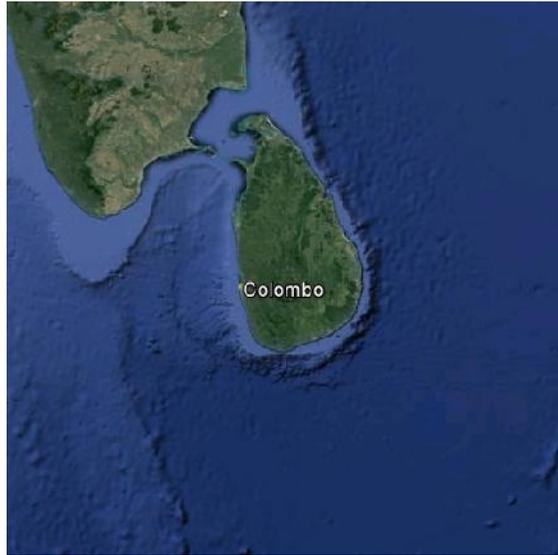
Introduction

- Sea level change monitoring is important for various environmental and socio-economic reasons.
- Sea level has traditionally been measured at tidal stations. However, these stations are few and sparse.
- With the increased accuracy of satellite altimetry measurements, provides an alternative technique to study the global and regional sea level changes.

Aim

To analyse the long term sea level changes around the Srilankan waters and to quantify the trend using the altimetry sea surface heights since 1993 to 2012.

Methods

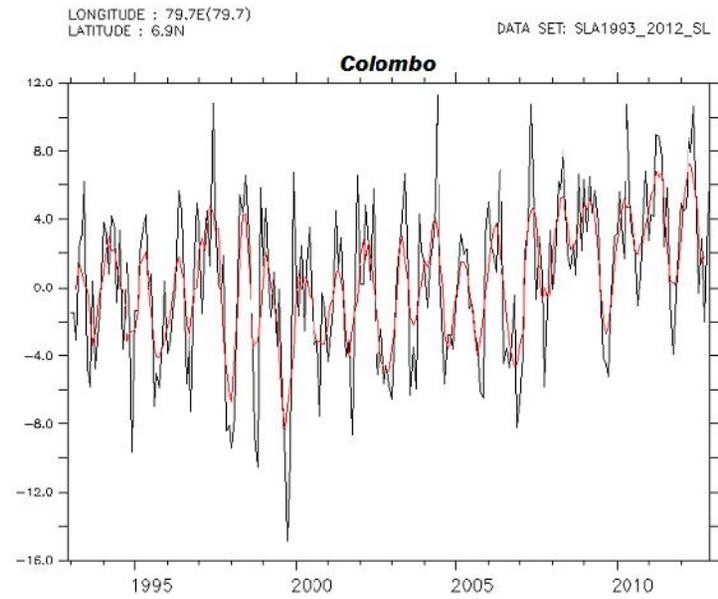
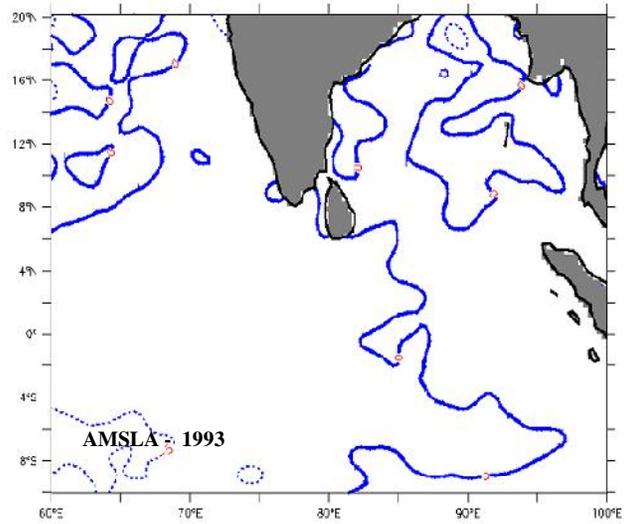


Processed altimetric data from Topex, ERS and Jason missions starting from January 1993 until December 2012 (20 years) was obtained from the AVISO website.

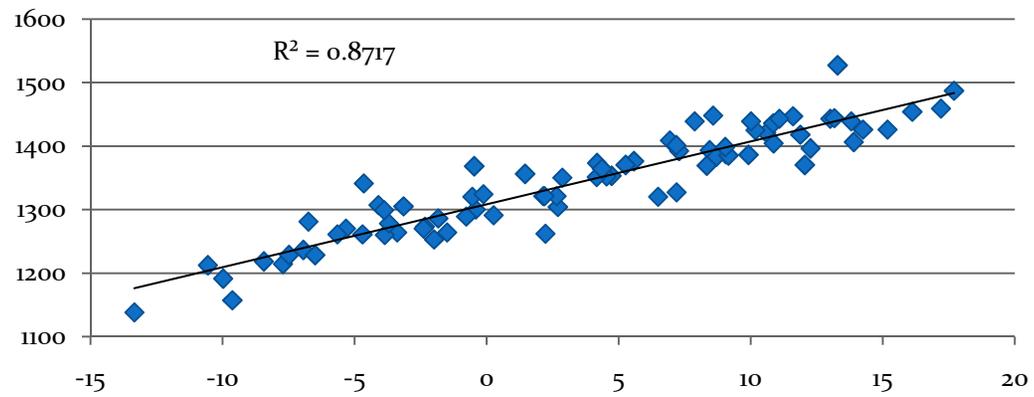
Ferret software was used in displaying and analysing the gridded MSLA time series data.

Colombo Tide Gauge data for validation

Results



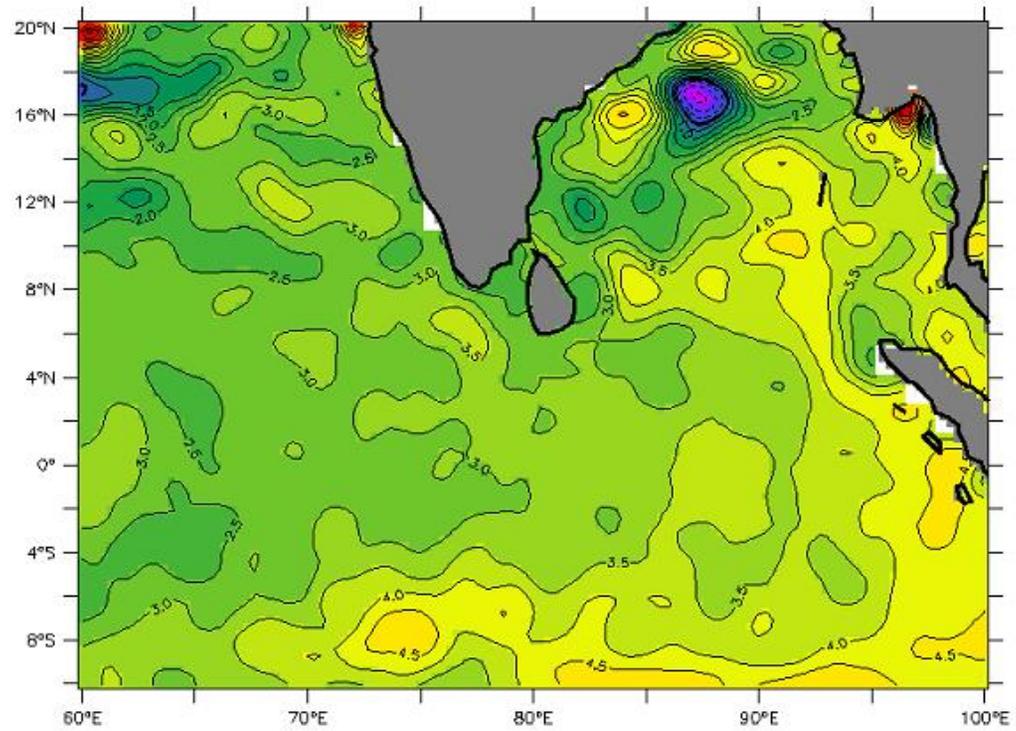
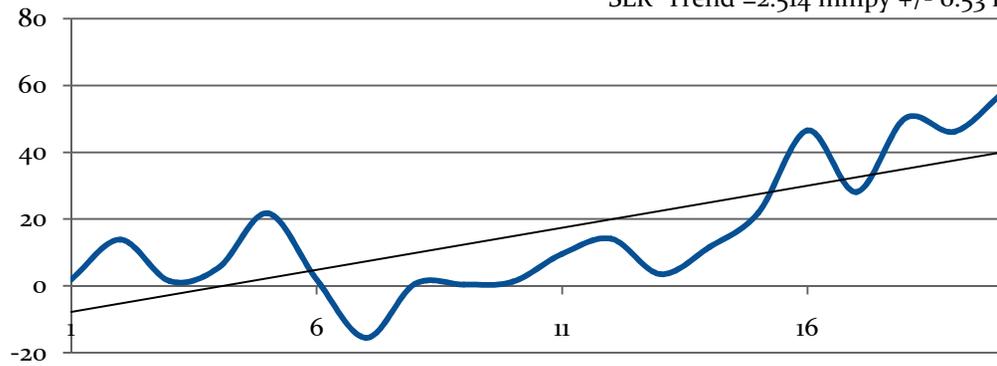
MSLA Correlation - at Colombo



Results cont...

Colombo

SLR Trend = 2.514 mmpy +/- 0.53 mm



Sea-level rise trends around Sri Lanka

Conclusions

- The sea-level rise trend around Sri Lanka is around 2.5-3 mm per year. This is more or less the same rate of the global mean sea-level rise value of 3.2 mm per year over the same time frame.
- The observed sea-level rise trend from the altimetry and tide gauge data are highly correlated ($R^2 = 0.87$) and it can be used to analyse the sea-level rise studies successfully, especially where there are no tidal stations available or no long term tidal observations exist.

References

Benveniste J. and Picot N., 2011. Radar Altimetry Tutorial, February 2011.

Cecile C., Anny C. and Christian Le P., 2001. Sea Level Rise During Past 40 Years Determined from Satellite and in Situ Observations, *Science*, Vol. 294 no. 5543 pp. 840-842, 26 October 2001.

Nidhesh A G., Lengaigne M., Vialard J., Unnikrishnan A.S. and Dayan H. 2013. Decadal and long-term sea level variability in the tropical Indo-Pacific Ocean, *Journal of Climate Dynamics*, vol 41, 2013, pp 381-402.

NIO 2004. Extreme Sea Level Variability Along the Coast of India, National Institute of Oceanography, Goa India, Vol 01, October 2004.

Unnikrishnan A.S., Nidheesh A.G., and Lengaigne M., 2015. Sea-level-rise trends off the Indian coasts during the last two decades, *Journal of Current Science*, Vol 108, No 5, March 2015, pp 966-971.

Warrick R.A., Le Provost C., Meier M.F., Oerlemans J., and Woodworth P.L., 1996: Changes in sea level. In: *Climate Change 1995: The Science of Climate Change. Contribution of WGI to the Second Assessment Report of the Intergovernmental Panel on Climate Changes*. Cambridge University Press, United Kingdom, and New York, NY, USA, pp. 359–405.

Thank You.