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Comment

David R. Brillinger

INTRODUCTION

This Report presents such a wealth of scientifically important, well-defined technical problems that all future submitters of nonnovel grant proposals will have some explaining to do. The Report is well-written, stimulating and full of sentences and phrases worth highlighting. I commend the Panel.

CURSORY REMARKS

The Report, Section 5, comments on the problem of noticing "interesting events" in the presence of masses of data. Perhaps some of the many existing procedures for detecting outliers might be of use.

The Report comments often on the problems of "aliasing" in many places. This seems to be an appropriate point in time to rethink the whole topic in both its active (selection of the measurement locations) and passive (working with those at hand) modes for all the various types of processes.

The Panel is concerned with how to move things forward. Having data sets and readme's conveniently available for anonymous ftp-ing seems an elementary way of quickly involving computer-literate statisticians. Email means that statisticians can collaborate with researchers around the world.

I was surprised to read in Section 7: "Even the El Niño phenomenon that affects weather patterns on a global scale can be initiated by an SST anomaly in the eastern tropical Pacific of only a degree or two." Is the genesis of El Niño really so well known?

David R. Brillinger is Professor of Statistics at the University of California, Berkeley, California 94720.

TIDES

There was minimal mention of the study of tides in the Report. I do not doubt that the Panel felt that they were important, and since I was asked to provide a data analysis, I will report on one for some tidal data.

Tidal prediction has been important for many years, surely predating the report's stated 1769 birth date of oceanography. Novel numerical techniques and computing machines have been developed, for example, the harmonic analyser of Lord Kelvin (Kelvin, 1911), and used routinely for preparing tables for harbours around the world.

The Bay of Fundy lies between New Brunswick and Nova Scotia. It is renowned for having the highest tides in the world, reaching 17 meters at times and places. Some data for it have have been studied. They were a sequence of $T = 2160$ hourly observations made in the Bay, near St. John, for the interval 1 January to 31 March 1991. A simple graph of the series shows a dominating periodicity of just over 12 hours. The top display of Figure 1 is the log-periodogram of the data flattened by subtracting the result of a robust smoothing; specifically, what is plotted is

$$(1)\quad \log\left(\left|\sum_{t=0}^{T-1} Y(t)\exp\{-i\lambda t\}\right|^2\right) - \operatorname{loess}_{\omega}\left\{\log\left(\left|\sum_{t=0}^{T-1} Y(t)\exp\{-i\omega t\}\right|^2\right)\right\}$$

where loess_ω is the robust smoother of Cleveland (1979). The robust character of this smoother "removes" the peaks. The dashed horizontal line gives an approximate upper 95% marginal significance