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Davis R E. Predictability of sea surface temperature and sea level pressure anomalies over the North Pacific Ocean. *J. Phys. Oceanogr.* 6:249-66, 1976.
[Scripps Institution of Oceanography, University of California, San Diego, CA]

This paper examines the statistical relation between anomalous patterns of sea-level pressure and sea-surface temperature in the North Pacific basin. The correlation of these patterns is examined for evidence that the ocean influences future atmospheric development. None is found. [The *SCI*® indicates that this paper has been cited in over 160 publications since 1976, making it this journal's most-cited paper.]

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This paper was motivated by the pioneering research of Jerome Namias.[1] He had presented some persuasive evidence that short-term climatic fluctuations (variations lasting a few months) over the North Pacific and North America were influenced by oceanic processes that produce anomalous patterns of sea-surface temperature (SST) in the North Pacific. Namias has, for many years, prepared outlooks for seasonal weather patterns over North America, and these forecasts are, in part, based on the structure of anomalous SST patterns in the North Pacific. It is clearly important to achieve skill in such forecasts, and the notion that the ocean might be important in establishing atmospheric anomalies is fascinating to oceanographers. This led to a large national oceanographic study, NORPAX, which during the 1970s examined interannual fluctuations in the North Pacific. This paper is one Scripps Institution of Oceanography contribution from that program.

Namias's approach, like that of many great scientists, is intuitive and not readily communicated. My intent in starting this study was to discover a simple quantitative description of the ocean-atmosphere connections that he uses in forecasting and to demonstrate that knowledge of the ocean does make forecasting possible. The statistical examination indicated that the correlation of SST patterns and sea-level pressure (SLP) patterns over the North Pacific is largely the result of the atmosphere driving the upper ocean. While SST could be partially predicted from previous SST, and SLP could be partially specified from simultaneous SST, no reliable connection between SST and SLP was found.

This finding was, of course, not what we wanted. It continues to impress me how Namias accepted the results. He correctly pointed out that the correlation approach would not find all kinds of predictability and that the possible seasonality of SST/SLP connections was not really accounted for (in fact, a subsequent study[2] showed some significant predictability from fall SST to winter SLP). What is remarkable is that Namias regarded the study, which might have been thought to threaten a major element of his life's work, with objectivity and supported continuation of similar work. In a field where charlatanry is the rule rather than the exception, this attitude stands out as an important commentary on the man.

Why is the paper widely cited? I suspect the answer lies in the methodology employed rather than in the results. The analysis challenge was to separate chance co-occurrences among many variables from genuine statistical correlations. I discovered, during review, that the approach used was essentially that which Edward Lorenz had used years earlier in an atmospheric predictability study that appeared only in a Massachusetts Institute of Technology project report.[3] If this wonderful piece of work had been more widely available, my paper would have been lost in obscurity, and I would have lost the opportunity to rediscover a great wheel.

1. **Namias J.** Large-scale and long-term fluctuations in some atmospheric and oceanic variables. (Dyrssen D & Jagner D, eds.) *The changing chemistry of the oceans: proceedings of the Twentieth Nobel Symposium.* Stockholm: Almqvist & Wiksell, 1972. p. 27-48. (Cited 45 times.)
2. **Davis R E.** Predictability of sea level pressure anomalies over the North Pacific Ocean. *J. Phys. Oceanogr.* 8:233-46, 1978. (Cited 50 times.)
3. **Lorenz E N.** *Empirical orthogonal functions and statistical weather prediction.* Cambridge, MA: Statistical Forecasting Project, MIT, 1956. 129 p. Scientific Report #1. (Cited 95 times.)

