CORRESPONDENCE

Comments on "Regression Forecasting of the Onset of the Indian Summer Monsoon with Antecedent Upper Air Conditions"

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For several years I have been half-heartedly suggesting that the American Meteorological Society devote a section of the *Bulletin* to brief reports of negative research results. Besides helping us gain a more balanced view of progress in our discipline, such reports would warn other investigators off already trodden dead-end pathways.

In publishing the paper by Kung and Sharif (1980), the editors of the *Journal of Applied Meteorology* have taken a leaf from my book. As with all earlier attempts to anticipate various facets of the Indian summer monsoon, the authors' application of multiple-regression techniques to forecasting monsoon "onset" in southwestern India (Kerala) failed in the important extreme year of 1972 (see, for example, Normand, 1953).

The negative impact of this finding can be reinforced by evaluating the forecasting performances listed in Kung and Sharif's Table 6. They used seven separate regression equations derived from dependent data for the periods 1958–71, 1958–72, 1958–73, 1958–74, 1958–75, 1958–76 and 1958–77 to forecast onset dates for the subsequent independent data years. Table 1 compares their errors to the errors resulting from the simple assumption that onset would occur on 2 June, the median onset date for the years 1901–67 (Ananthakrishnan *et al.*, 1967). Even during the near-normal years of 1973–78, when the regression equations might have been expected to perform best, they failed to equal climatology.

I am encouraged by what may prove to be a new AMS policy favoring publication of negative results. In future, however, papers of this type should be much briefer and more sharply focused.

Despite their apparent satisfaction with the results, Kung and Sharif (1982) decided they could do better by widening the search for predictors from south India to the northern Indian Ocean and to Australia. They now developed two sets of multiple regression equations for rainfall over central India as well as onset dates over south India. First, from among an unspecified number of variables 18 or 19 were identified as having the highest correlations with either onset or rainfall. Then from these the equations incorporated five or six regressors that together accounted for about 90% of the variance.

No compensations were made for the many observational shortcomings identified.

The history of seasonal forecasting is a history of unstable multiple regression equations leading one to conclude that the equations failed to reflect *physically linked* events. Kung and Sharif first justified identifying groups of possible predictors by *a priori* physical reasoning. However, they made no attempt to account for the predictors they did select, let alone the reasons behind predictor-predictand lags that varied by as much as three months. In this respect, then, physical understanding has not advanced since Walker's time and Kung and Sharif were led to admit that "the continuous updating of the regression equations should be an integral part of the regression forecasting scheme." In their procedure, "The forecasted onset date and rainfall in each individual year are obtained with separate regression equations whose coefficients were fitted without involving data of the forecast year thus making the forecast year independent of regression fitting." However, since each set of dependent years straddled each forecast year (except the last), trends were built in to the equations, a luxury not available in operational seasonal forecasting.

TABLE 1. Average errors (days) in forecasting onset of the summer monsoon over southwestern India using (A) the regression equations of Kung and Sharif (1980) and (B) the median onset date for the period 1901–67 (2 June).

Forecast years	A	B
1972–78	4.7	6.4
1973–78	6.8	4.8
1974–78	5.2	3.8
1975–78	5.0	3.0
1976–78	6.0	3.3
1977–78	5.5	4.5
1978	4	5

The performance claimed by Kung and Sharif is sufficiently better than their earlier results to warrant testing by the Climate Analysis Center of NOAA on the years since 1978, to determine the stability of the regression equations based on the period 1957–77.

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