AN ATTEMPT OF LONG-TERM FORECAST OF SARDINE CATCH ALONG THE EASTERN ADRIATIC COAST

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Summary

Basing on the results obtained by spectral analysis of 100-year series of sardine catch data along the eastern Adriatic coast,we have made a long-term forecast.

Résumé

On a essayé de donner le pronostic de la pêche de la sardine sur la côte orientale de l´Adriatique à partir des résultats de l´analyse spectrale pour un intervalle de cent ans.

The previously obtained results have shown that the fluctuations in sardine catch could be decomposed into four simple harmonic functions with periods of 2.5, 3.9, about 8 and 11 years (R e g n e r and G a č i ć, 1974). It has also been found that the amplitudes of 8 and 11 year harmonics are almost equal. As some other phenomena have the same periodicities, it has been concluded that these periods are of natural origin, what means that natural fluctuations in the stock affect, to some extent, the fluctuations in sardine catch. So, taking into account these four harmonics we intend to consider only natural causes of sardine catch fluctuations.

Knowing the periods of dominant harmonics, it was possible to make tentative forecast of sardine catch fluctuations using the equation:

$$U = \sum_{i=1}^{4} A_i \cos \frac{2\pi}{T_i} \left(t + f_i \right),$$

where T_i are the periods of 2.5, 3.9, 8 and 11 years and A_i the relative values of amplitudes of 0.309, 0.358, 0.503 and 0.503.

The main problem was how to determine the phase lag (f_i) between the harmonic functions. Analysing the shape of the statistical data on the sardine catch, we have concluded that in 1950 almost all harmonics had their maxima as well as that phase lag between them was equal to zero. So, we started our calculations from that year. Results obtained are shown on Fig. 1.

As it could be seen from the Fig. 1, the maxima of calculated curve coincide fairly well with the maxima of sardine catch in the interval from 1950 to 1975. The rest of the curve, from 1976 to 2050 year, shows the possible fluctuations of sardine catch around the mean, pressuming that fishing intensity would not change markedly and that the harmonics of periods greater than 11 years could be neglected.

References:

Regner S. and M. Gačić, 1974. The fluctuations of sardine catch along the eastern Adriatic coast and solar activity. Acta Adriat., 14, 11, 1-17.
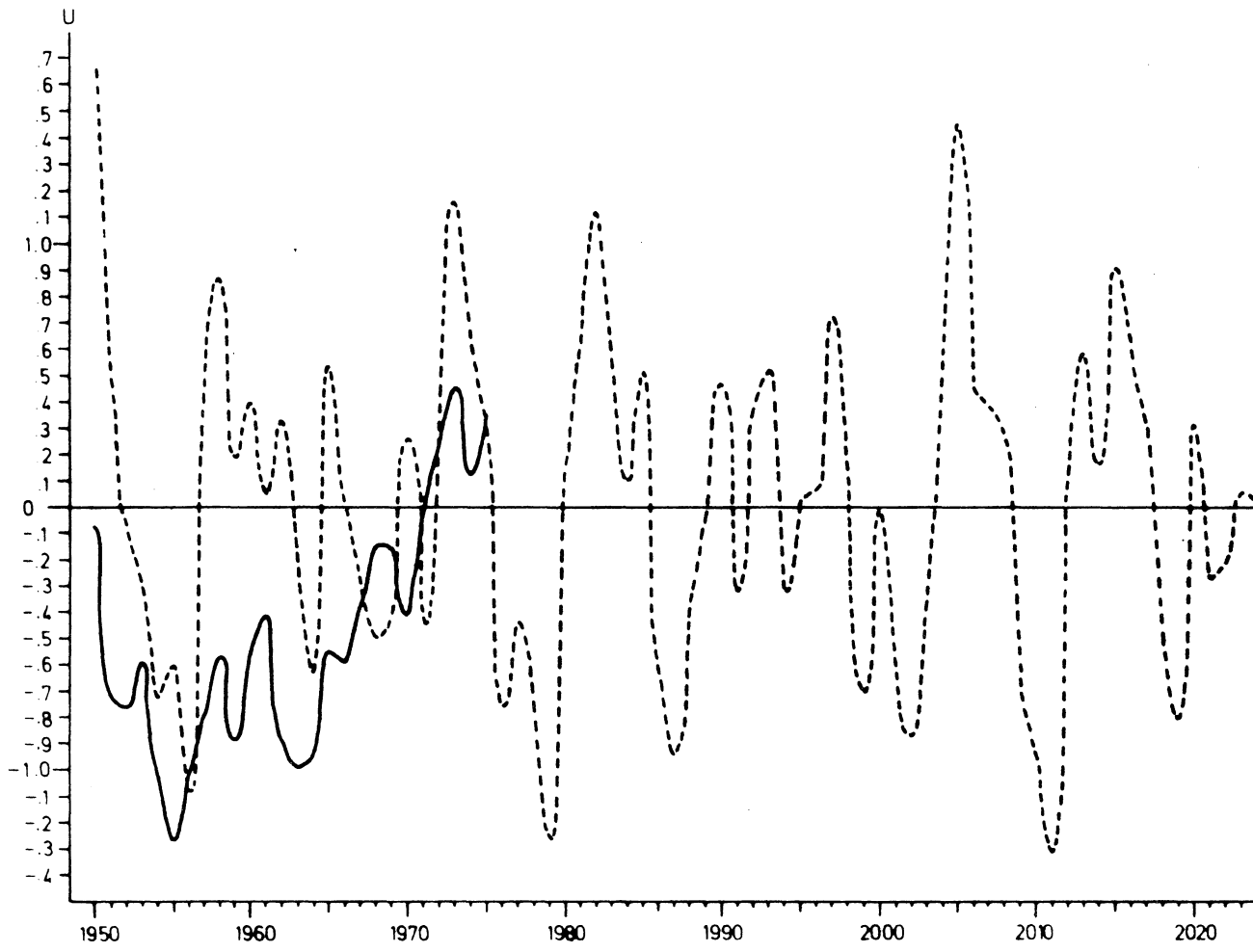
FIG. 1   SARDINE CATCH ALONG THE EASTERN ADRIATIC COAST (CALCU