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8107 DISCUSSION

The analysis of annual extreme sea levels at certain ports in southern England

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The secular trend of mean sea level at Southampton (1951–55 and 1957–66) and Portsmouth (1962–76) has also been investigated by us using multiple regression analysis. With local mean barometric pressure and time as independent variables it is estimated that the rise in mean sea level at Southampton and Portsmouth is 1·10 mm/year and 5·96 mm/year, respectively. There is good agreement with regard to the former, but the latter value is significantly lower than that derived by the Authors (8·35 mm/year).

26. The explanation almost certainly lies in the inclusion of more recent data (1975–76) and lower values of mean sea level in 1973–74 than used by the Authors.[11] Nevertheless, the discrepancy between the two nearby ports is still quite large. However, the problem of comparing secular sea level trends at different places and for different epochs is well known.[12] A more uniform pattern would doubtless emerge if corresponding periods were analysed.

27. The concept of a regional dimensionless factor has obvious appeal and the factor used in Table 4 was introduced by Lennon[1] to establish the regional distribution of extreme levels on the west coast of England. However, in this case it would appear to be justifiable only if the numerator of the factor (i.e. $h_n = n$ year level − MHWS) is proportional to the spring tidal range within a region. For the Solent region, where the spring range in Christchurch Bay is about one half of that at Spithead, there is evidence[13] to suggest that this is not so.

28. It would seem that, for design purposes, h_n may be a more appropriate regional criterion. If this procedure were adopted the 50 year level would be MHWS + h_{50}, and so on. This would take account of those cases where—such as near an amphidromic point—the range of the tide may differ appreciably over a relatively short distance.

Mr Blackman and Mr Graff

We are interested in the comments of Mr Davies and Mr Webber concerning the use and interpretation of empirical factors as a measure of assessing more strictly the regional distribution of extreme level occurrences. We accept these comments; indeed, the sensitivity of the Lennon type measure is discussed in references 9 and 14. Further research[15,16] has highlighted the sensitivity of the analysis procedure as used in a conventional way in the computation of return period heights as presented in the Paper. These recent findings indicate that there is a considerably less strict value associated with estimated heights relating to defined return periods and that these values can differ in response to the port location and any period of data analysed. As such it would seem inappropriate at present to enhance the use of any regional factor which is a measure that would involve a strictly defined estimate of a return period height.

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