

### Book Reviews

**Environmental studies in Port Valdez, Alaska**, edited by D.G. Shaw and M.J. Hameedi (Lecture notes on coastal & estuarine studies Vol. 24), Springer-Verlag, Berlin, 1988, pp. xiv + 423, 46 Figs, 740 g, Soft cover, DM 98.  
[ISBN 3-540-96677-3]

Aquatic systems have a definite capacity for assimilating contaminants without exhibiting significant deleterious effects. This assimilative capacity of any particular region of the marine environment is determined by processes like currents, residence time of the contaminant, geomorphology of the region, sedimentology, chemical cycling and bio-degradative ability of the environment. Disturbances, both natural and man-made, induce the ecosystems to react and result in shifts in biological communities to adjust to the changes, which could indicate the effects of the disturbances. In this book, the third in the series on Port Valdez and also a truly comprehensive study of this type, the disturbances caused by the discharge of treated ballast water (still containing 8 to 10 ppm of the most soluble fractions of petroleum hydrocarbons) in the flora and fauna of this particular environment, a land locked harbour, are given.

The underlying theme of this book is the monitoring of the interaction between chemical processes, aquatic transport of oil and hydrocarbons, their distribution and amounts in the biotic compartments with detailed accounts on the responses of the biotic components. This monitoring programme is designed to detect changes in water quality by examining temporal responses of resident microflora and fauna to treated ballast water. This includes studies needed to evaluate the effects of chronic, low levels of petroleum hydrocarbons on intertidal organisms and also to permit assessment of the damages caused to such organisms in the event of an oil spill.

The study also includes the microbial component, meio fauna and macro fauna of the rocky shore, their distribution and abundance. The effects of hydrocarbons on marine birds and mammals are also studied and discussed.

This book contains 16 chapters, the contents of which range from the description of the physical environment under study to the effective use of the scientific information collected through a meticulously planned study, for proper management of this environment. Particularly the chapters on hydrocarbon accumulation, bio-conversion and sub-lethal effects of these chemicals are highly informative. Al-

though the study has not pointed out any ecologically significant biological changes to have taken place, it has shown that in this particular environment the biological and physico-chemical changes are largely controlled by storm patterns, rather than by pollution.

A few crucial points that emerge from this study are (a) that this type of monitoring programme contributes little information in detecting ecosystem changes due to natural disturbances from those caused by anthropogenic disturbances, since the former far exceeds the latter (b) understanding the pelagic ecosystems is also essential to identify causative linkages between biological changes and specific disturbances, and (c) to protect an environment from anthropogenic disturbances one must understand the process that controls the ecosystem well enough to understand and observe even very small changes.

The quality of the material contained in different chapters of this book reflects a high level of planning and dedicated work carried out by different contributors to this book. This could be used as a case study in the investigation of ecosystem changes in an environment subjected to pollution.

In short the book is well written and would certainly form a classical reference work for those who are interested in environmental monitoring through studies on ecosystem changes.

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**The Bunker climate atlas of the north Atlantic Ocean Vol. 2: Air sea interactions**, by H.J. Isemer & L. Hasse (Springer-Verlag: Berlin-Heidelberg-New York-London-Paris-Tokyo), 1987, 207 Charts, 37 Figs, pp. vii + 252, 1710 g, Hard cover, DM 350.

[ISBN 3-540-17594-6]

Interests in the field of air-sea interaction are growing in the recent past. This is seen from the way the global scale experiments such as World Ocean Circulation Experiment (WOCE) and Global Ocean Flux Study (GOFS) are planned and executed. The measurements made on the various parameters uti-

lising hi-tech instruments—stationary or drifting in the ocean—capable of providing long term measurements of the medium together with the increased facilities for communication and computation added a new dimension to these studies. While acknowledging these, one should recognise the impact of modelling permitting predictions of various geophysical processes including air-sea fluxes and their inter-media transfers to desired levels. Some of these could be seen in this attractive, useful compilation in the form of an atlas with 20 pages text encompassing a well presented introduction, the parameterisations, the methods of inversions for the air-sea heat fluxes and wind stress followed by neatly made, information rich diagrams and charts for the region of north Atlantic. The study basically takes its origin from the unpublished and (believably) incomplete files of Bunker on some important aspects of air-sea interaction.

The present atlas would be useful to the graduate students in marine climatology and equally to those researchers requiring data on various elements (derived) such as fluxes of radiation, heat and momentum. The raw data available on magnetic tapes would be a valuable option to the needy. The use of these data, synthesizing the very diverse forms of information into a self-consistent picture, for a modeler may provide just the adequate resolution for purposes of validation of the results. This is characteristically so by the number of atlases published in the recent past and speaks of probably the impeccable mathematical forms incorporated in the numerical models developed to obtain that extra information as governed by the input logic over other models computing the energy fluxes from conventionally acquired environmental data from Voluntary Observing Fleet (VOF) for over three decades beginning 1941, though with some additions accruing from time-series data from selective locations.

The following elements covered in this study deserve special mention.

(1) Time-latitude diagrams of zonal averages, i.e., isopleth graphs by month vs latitude for net shortwave radiation, net longwave radiation, latent heat flux, sensible heat flux, net radiation, oceanic heat

loss by net longwave radiation, latent and sensible heat fluxes, net air-sea heat flux, evaporation, east component of wind stress, north component of wind stress, absolute value of wind stress and curl of wind stress. The SI system of units have been used throughout the atlas.

(2) Diagrams of annual cycles in characteristic (representative) areas for net shortwave radiation, net longwave radiation, net radiation, latent heat flux, sensible heat flux, oceanic heat loss by net longwave radiation, latent and sensible heat fluxes, net air-sea heat flux, east component of wind stress, north component of wind stress, absolute value of wind stress and direction of wind stress.

(3) Charts (maps) of monthly (in 3-month interval beginning from January) and annual means and annual ranges (Bunker's original results) for net shortwave radiation, net longwave radiation, latent heat flux, sensible heat flux, net air-sea heat flux and wind stress.

(4) Maps of monthly (in 3-month interval beginning from January) and annual means and annual ranges (revised air-sea interactions) for scalar wind speeds (revised Beaufort scale), net shortwave radiation, net longwave radiation, net radiation, latent heat flux, evaporation, sensible heat flux, oceanic heat loss by net longwave radiation, latent and sensible heat fluxes, net air-sea heat flux, wind stress and curl of wind stress, east and north components of wind stress, Ekman volume transport, vertical Ekman velocity, stream function of annual Sverdrup transport.

A fairly comprehensive and accessible literature in the form of references at the end of the text widens the utility of this monumental and long-lasting work. The analyses presented in the form of maps and graphs are of excellent quality and reflect the degree of devotion by the coveted pair of researchers. The printing and the overall finish certify the well deserved job executed by the professional publishers.

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