References related to Siliciclastic Erosion, Transport and Sediment Budgets

Almagor, G. and Karnieli, A., 1996, Sediment transport over the continental slope offshore northern Israel: an analysis by means of electron microscopy, Sedimentary Geology, v103 n1-2, pp 63-84

ABSTRACT: Seven subsamples from cores collected from the continental terrace offshore northern Israel were examined by TEM and SEM. These samples represent different sedimentary environments. Detrital clay domains, mostly smectite, constitute up to 70% of the sediment bulk. Highly compacted silt-sized argillaceous clasts, lumps consisting of very dense, yet discernible clay domains and varying quantities of quartz grains and skeletal carbonate particles are randomly interspersed within the clay matrix. Current-transported quartz grains and skeletal debris from the continental shelf are mixed with these sediments. The analysis of the TEM and SEM photomicrographs supports the model of sediment dispersal patterns offshore northern Israel which was evaluated from radiographic studies of the cores and other data. -from Authors

Anderson, M. G., 1998, Modelling geomorphological systems, 458 pp

ABSTRACT: The 15 chapters of this book are all abstracted separately. They range over current modelling research in hillslope and river channel processes. The text shows the potential range of modelling activity within these process investigations and bears on three further elements: alternative modelling approaches; model validation and verification; and the improvement and more widespread use of computer simulations. There are 5 chapters on modelling of channels and sediment transport/yield, and 5 chapters on hillslope modelling. Other more general topics include catastrophe theory, equilibrium and network models, and computer simulation. -K.Clayton

Babic, L. and Zupanic, J., 1996, Coastal Dinaric flysch belt: paleotransport model for the Pazin Basin, and the role of a foreland uplift (Istria, Croatia), Natura Croatica, v5/4, 317-327

ABSTRACT: Sedimentary infill of the Pazin Basin, Istria, shows that the Eocene foreland basin in coastal Dinarides received the detritus from the outer (Adriatic) side, and not only from already known, inner, Dinaric (and/or Alpine) sources. The character of the material supplied from the SW indicates the existence of a carbonate area, which was partly exposed and partly covered by shallow sea characterized by carbonate deposition. This high area embraced the southern part of the present-day Istrian peninsula, and continued into the Adriatic offshore. This foreland uplift was undergoing deformation during the evolution of the Pazin Basin.

Bechteler, W. and Maurer, M., 1992, Reliability theory applied to sediment transport formulae, in: Stochastic hydraulics '92. Proc. IAHR symposium, Taipei, Kuo, J. and Lin, G. eds., pp 115-122

ABSTRACT: By the application of reliability index theory, the deviations (probability distribution) of every variable can be considered in their influence on the sediment transport rate. Furthermore this result is gained with experience and probability distribution. So on the one hand one can judge the deviations of the calculated sediment transport and on the other hand one has a useful tool to characterize the influence of each variable and its probability distribution on the final result. Those variables which determine the process most can be identified by this procedure. In this paper the bed load formula of Meyer-Peter, Muller as well as some total load formulas were analyzed. The single and combined influence of the uncertainties of the input variables on the final result determined. The possibilities of reliability theory (as a PC computer model) to sedimentation engineering practice are shown. -from Authors

Brookfield, M. E., 1994, The interrelations of post-collision tectonism and sedimentation in Central Asia, in: Tectonic controls and signatures in sedimentary successions, Frostick, L.E.and Steel, R.J. eds., pp 13-35

ABSTRACT: During the Late Tertiary the northwest Himalayas and adjacent ranges underwent progressively increasing uplift associated with crustal thickening and differential erosion. At the same time the adjacent Tarim and Tadjik basins and the Himalayan foredeeps subsided accumulating thick piles of clastic sediments. The ages of these accumulations have been used to infer contemporary tectonism in the mountains. Radiometric and fission track dating together with faunal and floral studies and sediment budget and river drainage studies allow gross rates of uplift and subsidence to be compared with net rates for different areas. These studies show that the bulk of the derived clastics were eroded from the fronts of the Karakorum, Himalayan and Pamir allochthons during progressively increasing rates of uplift and thrusting from Early Miocene times onwards. Nevertheless, cooling Cenozoic climates, partly driven by uplift, have also contributed to increasing physical erosion and coarsening of the deposited sediments through time. -from Author

Carter, L., 1986, A budget for modern-Holocene sediment on the South Otago continental shelf., New Zealand Journal of Marine & Freshwater Research, v20, pp 665-676.

ABSTRACT: A sediment budget for the South Otago, New Zealand, continental shelf and coast, between Nugget Point and Otago Peninsula, reveals that modern (post 6500 yr) sediment input is dominated by the Clutha River (total 3.14 Mt/yr; Mt = 10"SUP 6" tonnes). Contributions from the Taieri River (0.6 Mt/yr), the adjacent Southland shelf (0.4 Mt/yr), and the biogenic production of calcareous shell debris (0.25 Mt/yr) account for only 28% of the input. About half of the bedload (sand and gravel) reaching the Otago shelf is stored within a large nearshore sand wedge in the protected water of Molyneux Bay, off the Clutha River. Bedload that escapes storage (1.1 Mt/yr) is transported north-eastwards to be deposited on beach and inner shelf environments just N of Otago Peninsula. Suspended load (mud) accounts for over half of the sediment input (2.33 Mt/yr) and is nearly all transported from the study area to accumulate in north-easterly shelf and slope depocentres. -K.R.

Chen Wen-Juinn, and Kuo Ching-Ton, 1991, Numerical model of beach profile changes, in: Computer modelling in ocean engineering , Arcilla, A.S., ed., pp 219-225

ABSTRACT: Uses a different formula to calculate the on-offshore sediment transport rate and a new distributed function is employed. Also, a new submodel of wave deformation is considered in the surf zone. The concepts of moving boundary and adaptive grid system are adopted. -from Authors

Davidson-Arnott, R.G.D., 1981, Computer simulation of nearshore bar formation., Earth Surface Processes & Landforms, v6 n1, pp 23-34, 7 figs, 3 tables, 31 refs.

ABSTRACT: The model simulates wave-shoaling, breaking, and reformation along a profile normal to the shore from deep water to the beach and determines rates and directions of sediment transport under wave orbital currents and rip cell circulation. The model successfully generates a barred profile from an initial planar profile and under most conditions achieves a state of dynamic equilibrium with sediment circulating across the bars. Input values for wave height, wave period, offshore slope and tidal range were varied in turn in order to determine their individual effect on the shape of the equilibrium profile formed. –Author

Fang, J.H. and Chen, H.C., 1997, Fuzzy modelling and the prediction of porosity and permeability from the compositional and textural attributes of sandstone, Journal of Petroleum Geology, v20/2, 185-204

ABSTRACT: A new method is presented here for predicting porosity and permeability from the compositional and textural characteristics of sandstones. The method employs fuzzy modelling which is a linguistic paradigm based on fuzzy logic, rooted in the theory of fuzzy sets. The essentials of fuzzy modelling are explained using an example of which porosity and permeability values of a sandstone are predicted from five compositional and textural attributes. Compared to statistical modelling, fuzzy modelling is not only assumption-free but is also tolerant of outliers. Fuzzy modelling is capable of making both linguistic and numeric predictions based on qualitative knowledge and/or quantitative data. Thus, fuzzy modelling is not only appropriate for the problem discussed here, but is also desirable for many geological problems characterized by non-numerical knowledge and imprecise information.

Harris, P. T. and Baker, E. K., Cole, A. R. and Short, S. A., 1993, A preliminary study of sedimentation in the tidally dominated Fly River Delta, Gulf of Papua, Continental Shelf Research, v13 n4, pp 441-472

ABSTRACT: High resolution seismic profiles, surface sediment samples and cores document sedimentary facies. Tidal currents dominate in the transport of sandy sediments throughout the estuary. On the delta front (5- 17 m water depth) surface waves generated by southeasterly trade winds rework the muds and sands to winnow out the fine grained sediments, from March to November. During the northwest monsoon (December-March), minimal surface wave activity results in the deposition of

a mud drape, resulting in seasonal sand-mud interbeds (varves). Prodelta deposits extend below this depth from 17 to 45 m and contain massively bedded muds accreting at a mean rate 4 cm year "SUP -1" . A facies model for the deltaic sequence is presented and employed to derive a preliminary sediment budget for the delta. -from Authors

Kana, T. W., 1995, A mesoscale sediment budget for Long Island, New York, in Geology, v126 n1-4, pp 87-110

ABSTRACT: Study of the area along the south shore of Long Island, confirms net westerly transport and provides the first evidence that shoaling in Fire Island Inlet is due primarily to cannibalization of the immediate updrift compartments, particularly erosion of the foreshore below mean low water. This lowers estimates of longshore transport rates along most of the study area compared with previous estimates. Beach fills had measurable and positive effect on the sediment budget along the western half of the study area through the early 1970s. A field of 15 groins in the central study area is shown to trap 100% of the longshore transport and produce a local drift reversal. -from Author

Lees, B. G., 1992, Recent terrigenous sedimentation in Joseph Bonaparte Gulf, northwestern Australia, Marine Geology, v103 n1-3, pp 199-213

ABSTRACT: The southern part of the Sahul Shelf is an excellent example of a macro-tidal carbonate/clastic transition. A distinct lobe of Recent, seaward-fining, sand-sized material has prograded onto the shelf from the shallow, southern part of Joseph Bonaparte Gulf defining the path of bed load transport on the inner shelf. While this is a dominantly calcareous shelf, parts of the inner shelf are characterized by deep erosion in which relict sediments are excavated from the bed. -from Author

Leytham, K.M. and Johanson, R.M., 1979, Watershed erosion and sediment transport model. Final report July 75-June 77.

ABSTRACT: Describes the development and initial testing of the Watershed Erosion and Sediment Transport (WEST) Model. It is a deterministic conceptual model which operates in two phases. In the first one, hydrological and erosion processes associated with the land surface of a watershed are simulated, using the Agricultural Runoff Management (ARM) Model. The research work in this project centered on the second phase, in which the movement of water and sediment through a channel system is simulated using the CHANL Model. The model has been tested on laboratory data and on data from the East Fork River, Wyoming. - from US Govt. Reports Annoucements, 25, 1979

Martinez, P. A. and Harbaugh, J. W., 1989, Computer simulation of wave and fluvial-dominated nearshore environments, in: Applications in coastal modeling, Lakhan, V.C. and Trenhaile, A.S. eds., pp 297-340

ABSTRACT: Demonstrates that a digital computer can be used to create a three-dimensional model to simulate depositional processes in nearshore environments. This study of wave-dominated depositional systems has practical significance, because several investigations have found the major hydrocarbon accumulations occur in 'clean' well-sorted beach sands deposited in high energy beach environments. -from Editors

Peltier, E., Duplex, J., Latteux, B., Pechon, P. and Chausson, P., 1991, Finite element model for bed-load transport and morphological evolution, in: Computer modelling in ocean engineering, Arcilla, A.S ed., pp 227-233

ABSTRACT: We introduce here TSEF, a two dimensional numerical model for sediment bedload transport and morphological evolution. TSEF has the same finite element structure as the 2D code TELEMAC solving the shallow water equations. Several numerical schemes are tested for solving the continuity equation. -from Authors

Reid, L.M. and Dunne, T., 1996, Rapid evaluation of sediment budgets, 164 p.

ABSTRACT: Many land-management decisions would be aided by an understanding of the current sediment production and transport regime in a watershed and of the likely effects of planned land use on that regime. Sediment budgeting can provide this information quickly and at low cost if reconnaissance techniques are used to evaluate the budget. Efficient budget construction incorporates seven steps, which are described. Methods used in field-work and analysis must be selected according to the types of hillslope and channel processes active, the goals of the analysis, and the level of precision required. Methods for evaluating erosion and sediment transport rates are described, and four examples are given to demonstrate budget applications and construction.

Reid, I., and Frostick, L.E., 1986, Slope processes, sediment derivation and landform evolution in a rift valley basin, northern Kenya., in: Sedimentation in the African Rifts, Frostick, L.E, pp 99-111.

ABSTRACT: The current phase of landscape evolution is dominated by fluvial incision and slope retreat under semi-arid conditions. Rates of sediment derivation are high, with measured values of up to 1600 t km"SUP -2" a"SUP -1", and a catalogue of evidence of surface processes (rainsplash pillars, mobile soil mantles, etc.) illustrates the erosional dynamism of an area that currently receives a rainfall of only 300 mm a"SUP -1". A clearcut relationship emerges between slope gradient and erosion rate that allows us to model slope retreat and landscape evolution. A volumetric analysis gives an age to the present basin landform of 0.11 Ma. Analysis of sequential links in the sediment transport train permits us to match clastic materials deposited in the accumulation zones of rift valley basins (riverine floodplain, lake delta, beach) with those of the erosional source areas. -from Authors

Rivenaes, J.C., 1997, Impact of sediment transport efficiency on large-scale sequence architecture: results from stratigraphic computer simulation, Basin Research, v9/2, 91-105

ABSTRACT: The computer simulation model DEMOSTRAT, is a powerful tool in investigating the sequence development scenarios in a 2-D dip section. The model includes tectonic subsidence, eustasy, two- component (sand and mud) nonlinear diffusional sediment transport, compaction and isostasy. The transport coefficients in the diffusion equations express the system's ability to transport sand and mud, and are mainly dependent on climate and subaquatic processes. Keeping other model input parameters constant, the magnitude of transport coefficients seems to have an important impact on sequence development. With high transport coefficients, extensive erosion during sea-level fall and lack of sediment buildup above sea-level during rise may reduce the preservation potential for nonmarine sediments. In addition, the former slope break will be eroded during transgression, forming sand-rich slope or basin floor sediments that may be misinterpreted as lowstand fans. Moreover, the magnitude of transport coefficients has an impact on unconformity timing and development (shown in Wheeler plots).

Ross, W. C., Watts, D. E. and May, J. A., 1995, Insights from stratigraphic modeling: mud-limited versus sand- limited depositional systems, American Association of Petroleum Geologists Bulletin, v79 n2, pp 231-258

ABSTRACT: Quantitative stratigraphic modeling provides new perspectives on the controls on basin-fill stacking patterns, gross lithology distributions, and submarine fan deposition in siliciclastic systems. The modeling relates basin-fill geometries to the ratio of space creation vs. sediment supply. Sediment budgeting reveals two types of siliciclastic systems. Sand-limited systems develop in shallow basins or on basin margin platforms; have broad, muddy, wave-graded shelves; and are subject to exposure and major basinward shifts of shore- line with minor sea level falls. Mud-limited systems develop during progradation into deep-water basins, have narrow shelves with turbidites in a base-of-slope position, and are not particularly susceptible to major basin-ward shifts in facies. The fundamental importance of basin physiography and lithology budgeting as well as sea level is emphasised in contrast to eustatically based models. - from Authors

Ruch, P., Mirmand, M., Jouanneau, J. M. and Latouche, C., 1993, Sediment budget and transfer of suspended sediment from the Gironde Estuary to Cap Ferret Canyon, Marine Geology, v111 n1-2, pp 109-119

ABSTRACT: The separation of turbid estuarine water into bottom and surface nepheloid layers takes place in the Gironde itself and in the nearshore zone. The development of these two separate turbid layers is due to vertical (a turbid surface plume) and horizontal (bottom layer) salinity gradients. The thickness of the bottom nepheloid layer increases from the estuary towards Cap Ferret Canyon as a function of the thickness of the bottom waters. Suspended sediment in transit over the shelf break represents 2-3%

of the total discharge from the Gironde estuary. This is a considerable amount as 50% of the suspended sediment is trapped in the west Gironde mud patch and another undefined portion of the Gironde sediment load is transported along the coast by tidal currents. -from Authors

Syvitski, J. P. M. and Alcott, J. M., 1995, RIVER3: simulation of river discharge and sediment transport, Computers & Geosciences, v21 n1, pp 89-151

ABSTRACT: RIVER3 is an ANSI standard FORTRAN-77 numerical model that simulates the discharge and sediment load of rivers. From basic data on climate, hinterland geometry, and river characteristics, the model predicts four contributions to river flow (nival melt, ice melt, rainfall, and groundwater). The model has both deterministic and stochastic elements for the simulation of daily flow and channel size, and the transport rates for five sediment size fractions (from clay to gravel). Model output includes interannual variation of a river's discharge history and sediment transport, and an input file for basin-fill models (DELTA and GRAIN) already in use. RIVER3 is able to offer a variety of applications for the study of regional climatic change (past or future) on fluid discharge and sediment processes. -from Authors

Syvitski, J. P. M. and Daughney, S., 1992, DELTA2: delta progradation and basin filling, Computers & Geosciences, v18 n7, pp 839-897

ABSTRACT: The code of an ANSI standard FORTRAN-77 numerical model is provided. This 2-D model simulates the progradation of a fjord or graben delta and the resultant fill of one or more marine basins. It is applicable, however, to many deltas. A brief theoretical description outlines the multiple sediment transport paths that are used to accomplish this numerical simulation. The model can be used to predict sediment fill under complex sealevel fluctuations and irregularly shaped basins. -from Authors

Zhenhua Jiang, 1995, The motion of sediment-water mixtures during intense bedload transport: computer simulations, Sedimentology, v42 n6, pp 935-945

ABSTRACT: A new model, which couples fluid and particle dynamics, has been developed to study the motion of the sediment-water mixture during intense bedload transport, including the velocity profiles of both sediment and water, the roughness length of an upper plane bed and the thickness of moving sediment layers. The particle dynamics method, in which the equations of motion of each of many particles are solved directly, is applied to model the movement of sediment particles. Both computer simulation results and theoretical analysis have shown that the velocities of both sediment and fluid during intense sediment transport decrease exponentially with depth in the top layers of a fast-moving sediment-water mixture. -from Author

Zyserman, J. A. and Hedegaard, I. B.and Fredsoe, J.and Deigaard, R., 1991, Requirements to a sediment transport model for morphological modeling, in: Computer modelling in ocean engineering, Arcilla, A.S ed. , pp 261-270

ABSTRACT: Several sediment transport models are evaluated from the point of view of their applicability to morphological modelling problems. A discussion is presented based on several practical cases within the field of coastal engineering. –Authors