

# The Bengal Fan: Some Preliminary Results from ODP Drilling

Dorrik A. V. Stow,<sup>1</sup> James R. Cochran,<sup>2</sup> and ODP Leg 116 Shipboard Scientific Party\*

<sup>1</sup>Geology Department, University of Nottingham, Nottingham, NG7 2RD England; and

<sup>2</sup>Lamont-Doherty Geological Observatory, Palisades, NY, USA

## Abstract

Three deep holes, with a maximum penetration of 960 m below sea floor, were drilled into the distal Bengal Fan just south of the equator during ODP Leg 116. The entire section recovered is dominated by sandy silt and mud turbidites derived from the Ganges Delta and from the continental margin of the western Bay of Bengal, interbedded with thin pelagic clays and with biogenic turbidites probably from a local sea mount source. The effects of Himalayan uplift, sea level fluctuations, local tectonics, and fan channel/lobe processes have closely interacted to produce the observed sedimentary record of the past 17 million years since the early Miocene.

\*Coauthors include: James R. Cochran, Lamont-Doherty Geological Observatory (Co-chief scientist); Dorrik A. V. Stow, Nottingham University, England (Co-chief scientist); Christian A. Auroux, Texas A & M University, USA (ODP staff scientist); Kazou Amano, Ibaraki University, Japan; Peter S. Balson, British Geological Survey, Keyworth, Notts, England; Jacques Boulegue, Pierre & Marie Curie University, Paris, France; Garrett W. Brass, University of Miami, Florida, USA; Jeffrey Corrigan, University of Texas, Austin, USA; Stefan Gartner, Texas A & M University, USA; Stuart A. Hall, University of Houston, Texas, USA; Silvia Iaccarino, University of Parma, Italy; Toshio Ishizuka, University of Tokyo, Japan; Irena Kacmarska, Mount Allison University, New Brunswick, Canada; Heidemarie Kassens, Kiel University, West Germany; Gregory Leger, Dalhousie University, Halifax, Nova Scotia, Canada; Franca Proto Decima, University of Padova, Italy; C. V. Raman, Andhra University, Visakhapatnam, India; William W. Sager, Texas A & M University, USA; Kozo Takahashi, Woods Hole Oceanographic Institution, USA; Thomas Thompson, 580 Euclid Ave, Boulder, Colo, USA; Jean-Jacques Tiercelin, University of Bretagne, Brest, France; Mark Townsend, University of Nottingham, England; Andreas Wetzel, Tubingen University, West Germany; N. P. Wijayananda, National Aquatic Resource Agency, Colombo, Sri Lanka; and Colin Williams, Lamont-Doherty Geological Observatory.

## Introduction

Leg 116 of the Ocean Drilling Program (ODP) provided one of the few opportunities to drill into one of the world's largest submarine fans. Leg 96 of the Deep Sea Drilling Program (DSDP) drilled a series of sites on the mid- and lower Mississippi Fan (Bouma and others 1985, 1986) and several earlier legs have drilled isolated holes on the Bengal (Von der Borsch and others 1974), Indus (Whitmarsh 1974), Amazon (Hayes and others 1973), Nile (Ryan and others 1973), and Zambesi (Simpson and others 1974) Fans. These elongate submarine fans (Stow and others 1983) are large and complex and require much further study before a full picture of their characteristics can be pieced together.

The Bengal Fan, together with its eastern lobe, the Nicobar Fan, is the world's largest submarine fan (Von der Borsch and others 1974, Curray and Moore 1971, Curray and others 1982, Emmel and Curray 1984) covering an area of  $3 \times 10^6$  km<sup>2</sup> (Fig. 1). It is 2800–3000 km long, 830–1430 km wide, and over 16 km thick beneath the northern Bay of Bengal. Fewer than 100 piston cores have been recovered from the surface sediments, and only one spot-cored DSDP site (Leg 22, Site 218) has been drilled into the fan. This hole terminated in mid-Miocene sediments at a depth of 772 m below the sea floor. Four main pulses of sandy turbidites were identified, one in the mid-Miocene, two in the late Miocene-Pliocene and one in the Pleistocene (Von der Borsch and others 1974). The piston cores from the fan show that in most cases pelagic muds, 20–90 cm thick, are found overlying thin turbidite sands, most less than 10 cm thick.