out interruption by layers of normal, background sediment. There is no unequivocal evidence (such as intercalated burrowed layers) that the deposition of the entire sandstone complex took more than a few days.

(Re)deposition by a series of large, waning tsunami waves is the most likely explanation for the texture of the K/T sandstone beds, although locally gravity flows may have assisted in the transport of sands from nearshore areas. In shallow shelf-seas (Alabama, Texas) earliest Danian sea-level fluctuations have modified or (partially) removed the K/T sandstone complex. In the shallowest marine K/T site studied, the Parras Basin in northeastern Mexico, no sign of the K/T sandstone complex has been found.

INTRODUCTION

The K/T boundary in the Gulf of Mexico region is often marked by a graded unit of sandstone beds ranging in thickness from 5 cm to 9 m (Fig. 1) (Ross and Scotese, 1988; Smit et al., 1992b; Alvarez et al., 1992b). The sandstone complex is intercalated in a more or less continuous relatively shallow-water fine-grained clay or chalk sequence in Alabama and Texas and in a pelagic marl sequence in eastern Mexico, Haiti, and DSDP holes 536/540 (Alvarez et al., 1992a). We refer in this chapter to these sandstone beds as the K/T sandstone complex.

Elsewhere in the world—preserved only in the most continuous sections (El Kef, Tunisia; Agost, Caravaca, and Zumaya, Spain; Stevns Klint, Denmark; Woodside Creek, New Zealand)—the K/T boundary is marked by a few millimeters-thick layer of (red-stained) clay (Smit, 1990). This clay layer is characterized by anomalous enrichment of siderophile elements (iridium) (Alvarez et al., 1980), shocked minerals (Bohor, 1990), spherules that resemble microkrystites (Smit et al., 1992a), and spherules with Ni-rich spinels (Kyte and Smit, 1986; Montanari et al., 1983). The thin clay layer is therefore interpreted by many as an altered distal impact ejecta—or fallout—layer. The Ir-rich clay is immediately overlain by a few centimeters-thick detrital marl or clay layer, impoverished in microfossils in comparison with marls from just below the ejecta layer. The detrital clay probably reflects effects of low-productivity, "strangelove" ocean conditions (Hsü and McKenzie, 1990) following the mass mortality and extinction at the K/T boundary.

The discovery of the 180- to 300-km-diameter Chicxulub crater in Mexico—the best candidate for the K/T impact site (Hildebrand et al., 1991)—close to all the outcrops with sandstone units prompts the question of the origin of the sandstone complex: Is it really related to the K/T boundary and does it show signs of (Chicxulub) impact-related processes?

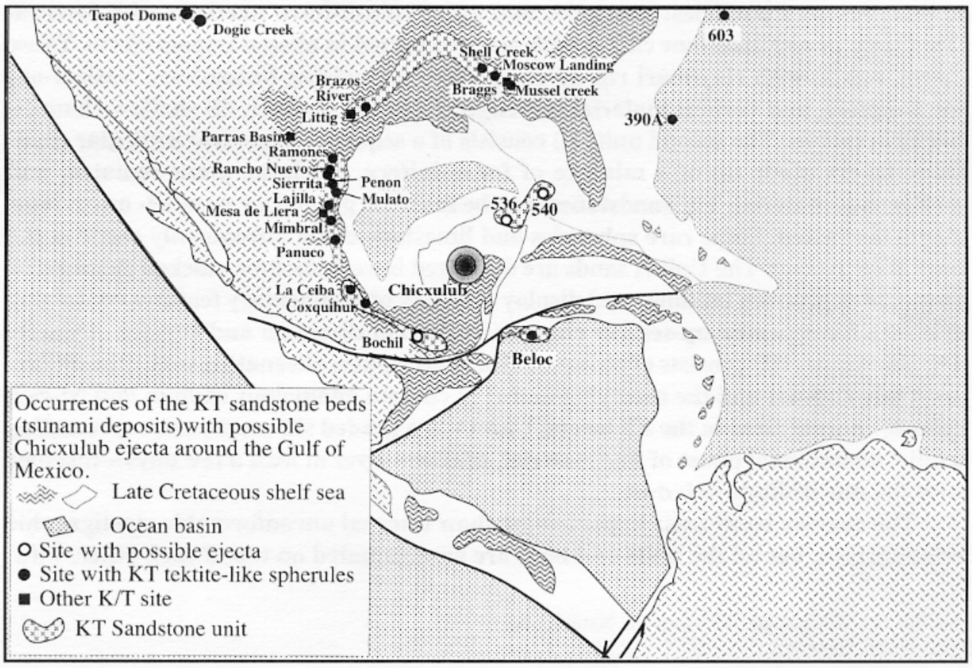

Figure 1. Map of the Gulf of Mexico, about 65 m.y. ago (Ross and Scotese, 1988), showing the Chicxulub impact and the location of outcrops with K/T sandstone complex deposits and sites where spherules (altered ejecta) have been found. 603, 390A, 536, and 540 are Deep Sea Drilling project sites.