

## CHAPTER-VI

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## 6.0 PALYNOFOSSILS AND STRATIGRAPHIC BOUNDARIES

## 6.1 STRATIGRAPHIC BOUNDARIES :

Detailed palynostratigraphic investigation of Paleogene section covering Paleocene to Oligocene in the investigated area provide a valuable palynostratigraphic information which leads to establish criteria for recognition of the Paleocene to Oligocene stage boundaries based on the exist/entry of characteristic palynotaxa.

## 6.1.1 Paleocene/Early Eocene Boundary :

In the studied subsurface section the Paleocene sediments corresponds to Olpad Formation encountered between 4060-4395 m and 1895-2000 m in wells Gandhar-A and Palej-A respectively. The samples in the above intervals have yielded fair microflora. The palynotaxa recorded in these formations are mostly long ranging in age. However, certain taxa referable to Monocolpopollenites sp and Proxapertites sp. suggest a tentatively Paleocene age. This age assignment is also supported by the record of Mulleripollis sp and Retidiporites sp in the Olpad Formation of well Ankleshwar Deep-1 (Koshal et al, 1988, unpublished ONGC Report). Hence due to lack of diagnostic Paleocene palynotaxa in the studied sections boundary between Paleocene/Early Eocene could not be drawn. However, on the basis of entry of Early Eocene characteristic palynotaxa Poly-

brevicolporites cephalus, Pellicieroipollis langenheimii and stratigraphic position, the boundary between Paleocene/Early Eocene has been placed at the base of Polybrevicolporites cephalus-Pellicieroipollis langenheimii assemblage zone.

### 6.1.2 Early Eocene/Middle Eocene Boundary

The uppermost part of Cambay Shale encountered in wells Gandhar-A, Pakhajan-A and Palej-A has yielded characteristic Early Eocene Palynotaxa Polybrevicolporites cephalus, Pellicieroipollis langenheimii. The palynotaxa Pellicieroipollis langenheimii has been reported from Lower Eocene sediments in Kutch (Sah and Kar, 1970, Saxena, 1979). Similarly, the taxa Polybrevicolporites cephalus has been reported from Lower Eocene sediments of Kutch (Venkatachala and Kar, 1969). The exit of Polybrevicolporites cephalus and Pellicieroipollis langenheimii make the criteria for establishing Early/Middle Eocene boundary below the base of Polycolpites flavatus-Proxapertites cursus assemblage zone.

### 6.1.3 Middle Eocene/Upper Eocene Boundary

In the studied subsurface section, Middle Eocene sediments were encountered between 2675-2980 m, 3560-3800 m and 1730-1875 m in wells Gandhar-A, Pakhajan-A and Palej-A respectively. Palynotaxa Polycolpites flavatus, Polycolpites granulatus, Polycolpites pedaliaceoides, Proxapertites cursus, Retipollenites confusus and Psilodiporites hammenii have their upper limit in the lower part of Ardol Member suggesting an age not younger than Middle Eocene. Polycolpites flavatus and Polycolpites granulatus are known from Lower Eocene to Middle Eocene of Kutch (Sah and Kar, 1970

Kar 1978, Kar 1985), Polycolpites pedaliaceoides known from Early Eocene sediments of Cambay Basin (Rawat et al., 1977) and also from Lower to Middle Eocene sediments of Cauvery Basin (Venkatachala and Rawat, 1972), Psilodiporites hammenii known from Lower to Middle Eocene sediments of Gujarat (Varma and Rawat, 1963) and also from Paleocene to Middle Eocene sediments of Cauvery Basin (Venkatachala and Rawat, 1972), Retipollenites confusus known from Early to Middle Eocene sediments of Cambay Basin (Rawat et al., 1977) and also from Early to Middle Eocene sediments of Kutch (Kar, 1985), Proxapertites cursus is known from Paleocene-Middle Eocene sediments in Carribian, Bornea (Germeraad et al., 1968), Paleocene to Middle Eocene sediments of Bengal Basin (Baksi, 1962 Baksi and Deb, 1980) and Paleocene to Middle Eocene sediments of Cambay (Rawat et al., 1977) and Kutch Basins (Kar, 1985).

The extinction of above mentioned species make the criteria for demarcating Middle/Upper Eocene boundary below the base of Palmaepollenites kutchensis - Margocolporites tsukadai assemblage zone.

#### 6.1.4 Upper Eocene/Oligocene boundary

In the studied area the occurrence of Palmaepollenites kutchensis, Margocolporites tsukadai, Proxapertites operculatus and Iugopollis tetraporites in the lower part of Dadhar Formation assign an age not younger than Upper Eocene and the Upper Eocene/Oligocene boundary has been delineated within the Dadhar Formation at the extinction level of Palmaepollenites kutchensis, Proxapertites operculatus, Margocolporites tsukadai and Iugopollis tetraporites. The characteristic Oligocene polynotaxa Magnastrictites howardii make its entry in the lower part of Dadhar Formation.

Proxapertites operculatus is known from Paleocene to Upper Eocene sediments of Africa (Van Hoenken Klinkenberg 1966, Germeraad et al., 1968, Salardcheboldeff 1977, Adegoke et al., 1978), Paleocene sediments of Columbia (Vander Hammen 1954, 1956b, Vander Hammen and Graciade Mutis 1965, Muller, 1968), Paleocene sediments of Bornea (Germeraad et al., 1968, Muller, 1968). In India Venkatachala and Rawat (1972) reported this species from Paleocene to Upper Eocene sediments of Cauvery Basin - Naskar and Baksi (1978) reported this species from Paleocene to Upper Eocene sediments of Rajasthan Basin. In Bengal Basin, Deb (1980) reported this species from Paleocene-Eocene sediments. Palmaepollenites kutchensis is known from Paleocene to Upper Eocene sediments of Kutch (Venkatachala and Kar 1969, Kar, 1978, Kar and Saxena, 1981), Eocene sediments of Cauvery Basin (Venkatachala and Rawat, 1972). Margocolporites tsukadai has been reported from Eocene sediments of Kutch (Venkatachala and Kar, 1969). In Bengal Basin it has been reported from Paleocene to Upper Eocene sediments (Baksi and Deb, 1980)

The entry of Magnastriatites howardii and extinction level of Palmaepollenites kutchensis, Margocolperites tsukadai, Proxapertites cursus and Iugopollis tetraporites in the lower part of Dadhar Formation make the criteria for establishing Upper Eocene/Oligocene boundary below the base of Palmaepollenites kutchensis - Margocolporites tsukadai assemblage zone.