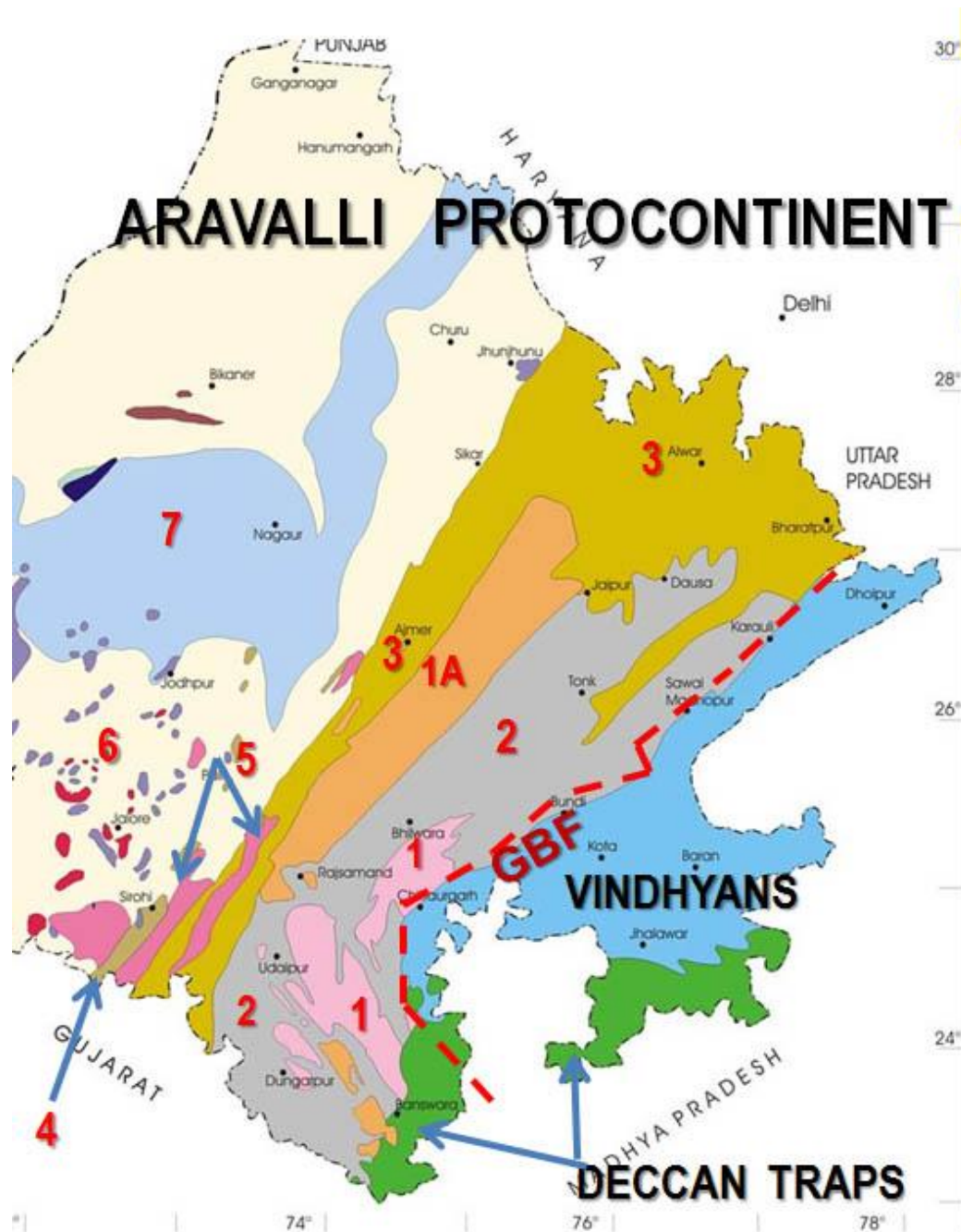


# K-T Magmatism in Rajasthan

Presentation by  
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# Deccan Traps

- Distribution: Cover an area of 10,000 sq km in parts of Kota, Jhalawar, Chittaurgarh and Banswara districts in south and south-east Rajasthan
- Geomorphologically it is NW fringe of Malwa Plateau having Flat topped hills amongst high rising sharp-edged ridges of Aravalli Mountain Belt. Palaeoslope of SW to NE.
- Classified as Pahoehoe Lava at the base of columns changing into aa type on top with blocky in upper sections.
- Intertrappean Beds at Gotmeshawarji in Pratapgarh, Jhalawar and Banswara
- Thickness varies from 15 to 70m in Jhalawar and 20-77m in Banswara



Aravalli Protocontinent  
constitutes of -

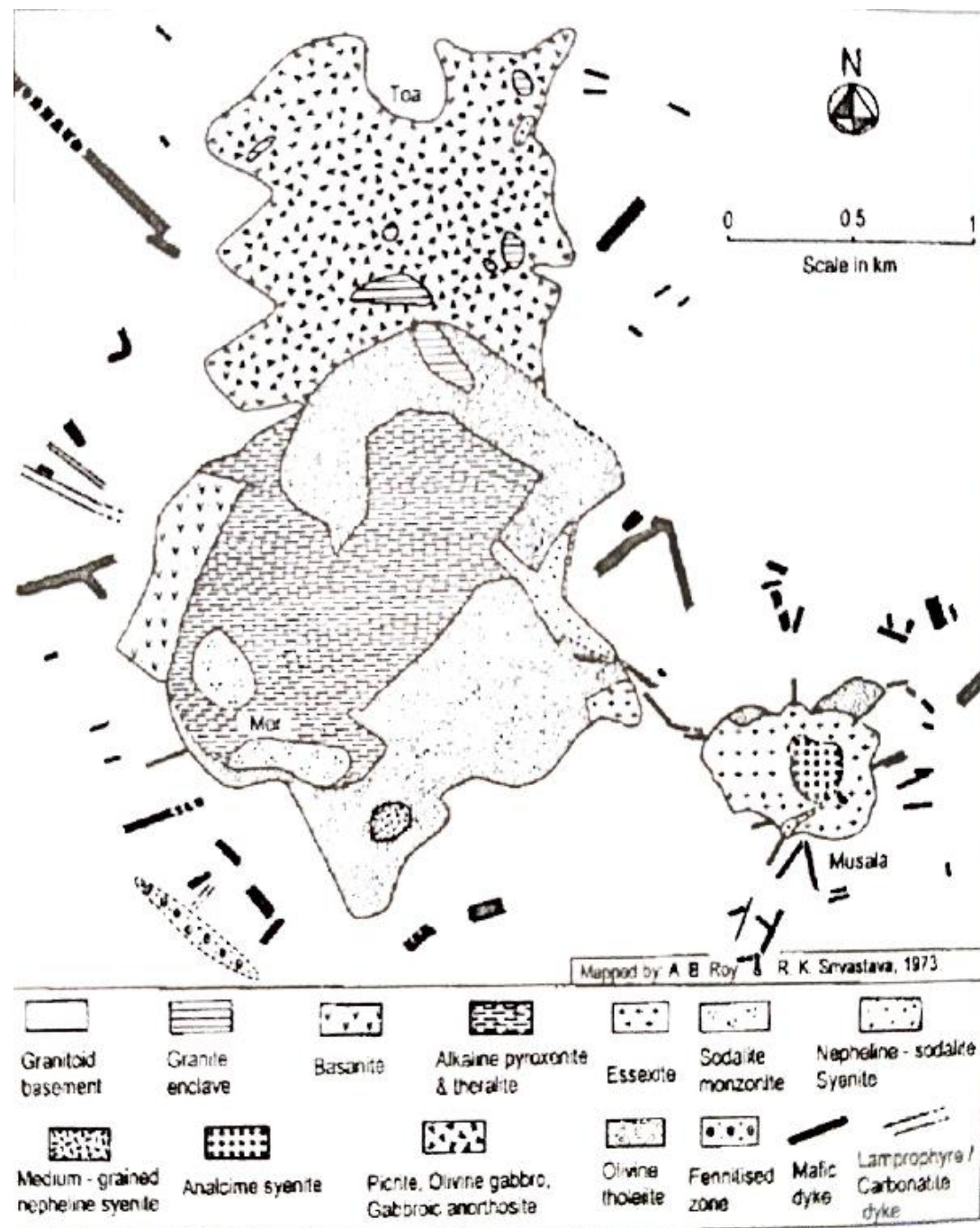
7. Marwar Supergroup
6. Malani Group
5. Erinpura Granite
4. Sirohi Group
3. Delhi Supergroup
2. Aravalli Supergroup
- 1,1A Archaean Basement  
(partially reconstituted)

# Deccan Traps continued:

- Composed of Chert, limestone and clay beds with red and green boles
- Traps are affected by N-S trending rotational faults. Faults are also seen in contact with Vindhyan beds which have led to abrupt termination of traps.
- Composed of Plagioclase pyroxene basalts with rare phenocryst of Olivine. Three major types include: Olivine Tholeiite, Quartz Tholeiite and Low-Calcium Quartz Tholeiite.
- Open System Crystallization in a near surface magma chamber (Pandit 1985).
- Srivastava et al., (1988) gave chemostratigraphic dividing these into 9 chemically distinct lava flows.

# Mundwara Alkaline Complex

- Named after Mundwara village 40km WSW of Sirohi.
- Three distinct physiographic units: Toa, Mer and Musala. First two forms the ring complex and third is a plug like body.
- Large number of concentric and radial dykes of different types occur around this three plutons
- Outer ring of Mer is of chilled marginal basanites and olivine tholeiites. Inside occurs mafic alkaline magma of alkali pyroxenite to theralite, essexite, sodalite-monzonite and nepheline syenite
- Musala pluton has prominence of essexite, analcite syenite and cross-cutting syenite. Vertical lineations in syenite suggest vertical rise.
- Toa ring has dominance of coarse grained picrate which grades to banded olivine gabbro and locally anorthosite. Only a small alkaline body of nepheline sodalite syenite is present.



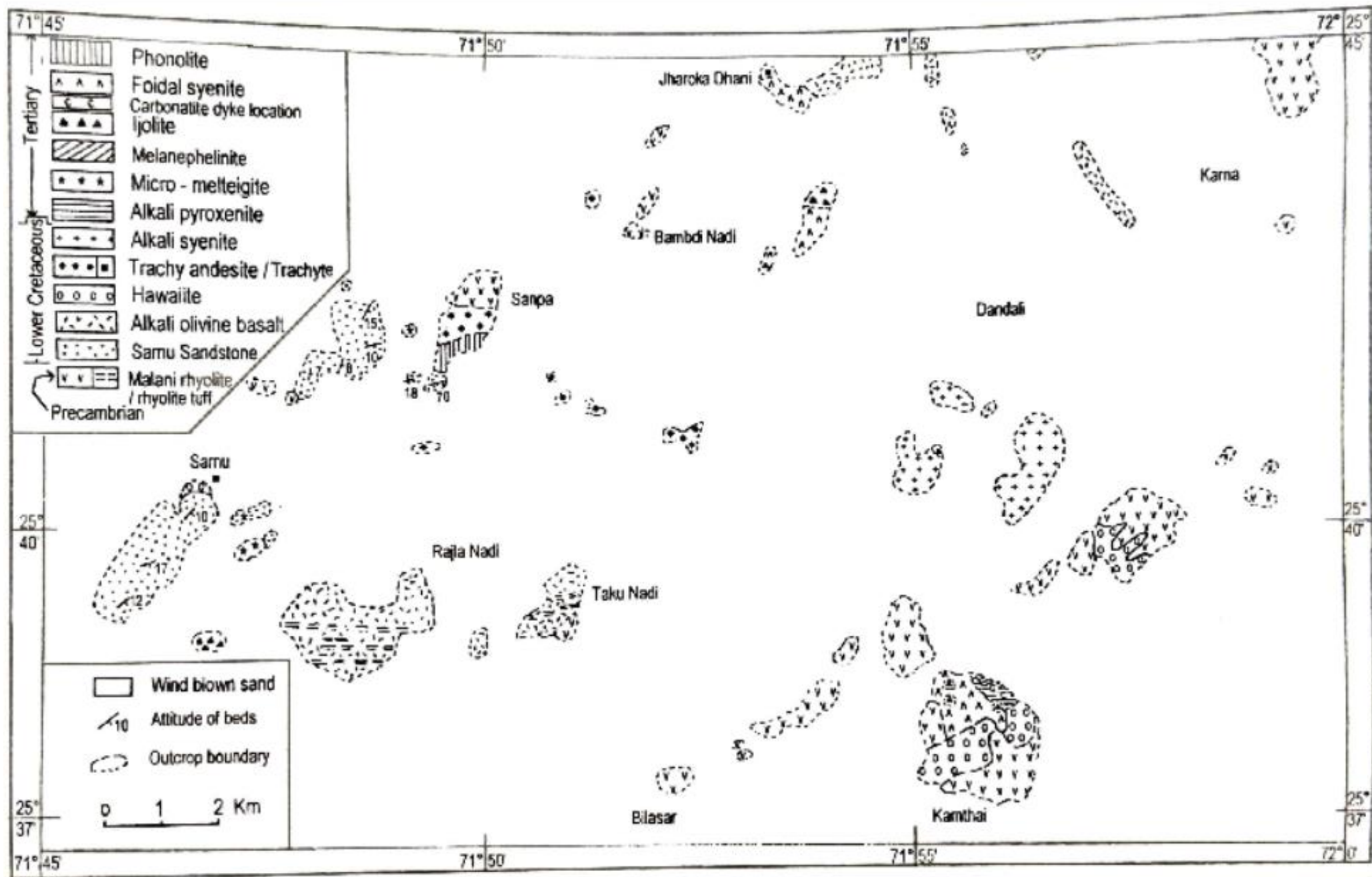
# Intrusives in Mundwara complex

- Four phases of intrusions:
  - 1. Alkali pyroxenite and theralite
  - 2. Cumuloberandrite, essexite and sodalite-monzonite
  - 3. Foidal Syenite
  - 4. Picrite, Olivine Gabbro and Gabbroic anorthosite
- Dykes include mainly: Basanite, Trachy-basalt, olivine tholeiite, phonolite and lamprophyre
- Besides these carbonatite dykes with chilled sharp margins and fenitized zones are also present.

# Sarnu-Dandali Complex

- The complex is located 150km northwest of Mundwara complex in Sarnu and Dandali villages of Barmer district
- Alkaline, intermediate and acidic rocks overlie the Malani Rhyolites denoted by alkali olivine basalt, hawaiites, trachy andesite and trachyte. Overlain by Sarnu sandstone of Cretaceous age.
- Occur as isolated plug-like bodies and dykes. Majority of these include micro-melteigite, ijolite, feldspathic ijolite, foidal syenite, phonolite and carbonatite.
- Alkaline rocks are seen to intrude the intermediate types.
- Phonolite dykes are youngest intrusive because they intrude Sandstone also.





# Intrusive sequence

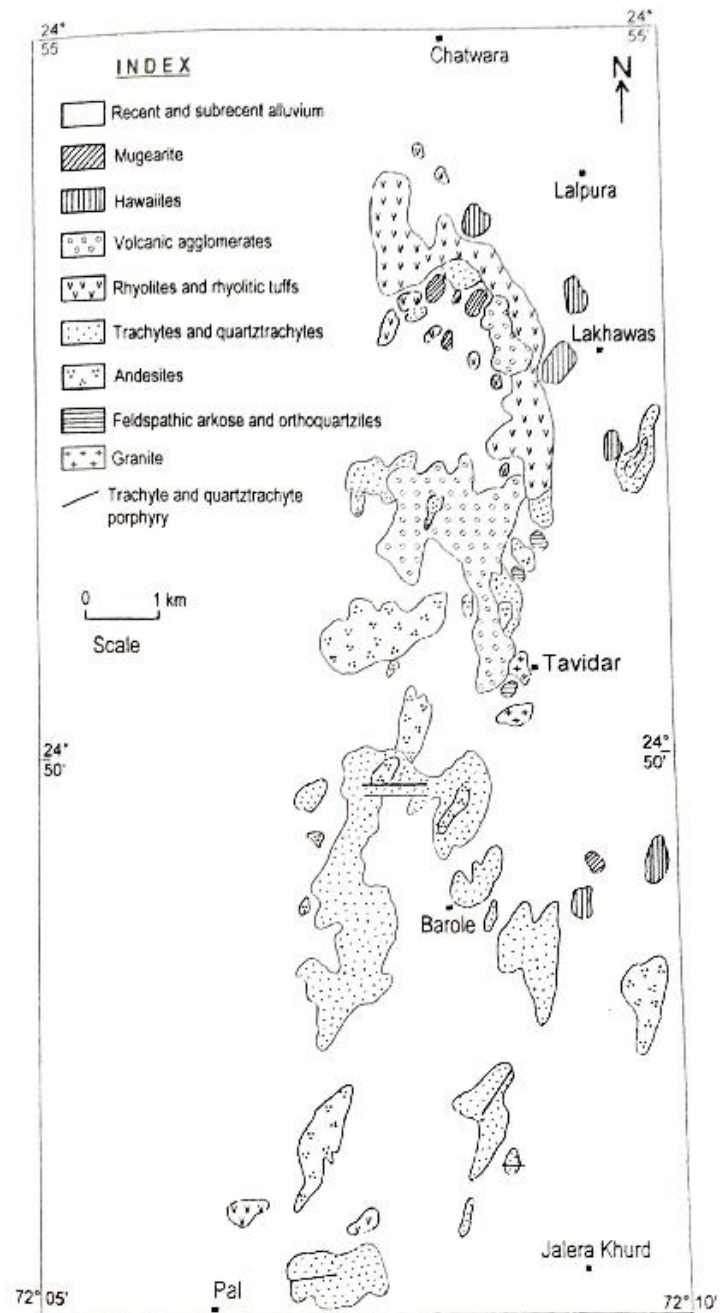
- Phonolite and phonolite porphyries
- Foidal syenite
- Carbonatite (Alvikite and ferrocarbonatite)
- Ijolite and feldspathic Ijolite
- Melanephelinite
- Micro-meltigite
- Alkali Pyroxenite
- -----
- Sarnu Sandstone

# Barmer (Sarnu Carbonatites)

- Carbonatite have dominantly E-W trend and occur southeast of Barmer. Numerous dykes of composition ferrocarbonatite, carbonated orthoclasite and carbonated trachytes are seen.
- Occur as bands of agglomerate containing fragments of carbonate rocks and other volcanic rocks
- Rich in REE, Sr and Ba.
- A complex sequence of crystallization of strontian Calcite, carboceranite, calcian strontianite and britholite (Ce mineral).
- Depth of generation is estimated to be 125 km as compared to 100 km for Mundwara Complex

# Tavidar Volcanic Suite

- Around Tavidar village in Jalore district covering an area of 70 sq.km.
- Composition of volcanic ranges from basic to acidic, without exposure of basement rocks.
- Sequence is as follows:
  - Hawaitte and Mugearite
  - Volcanic agglomerate
  - Rhyolite and Rhyolite Tuff
  - Trachyte, Quartz Trachyte
  - Andesite
  - Cretaceous Orthoquartzite (sandstone)
  - Malani Volcanics (??)



# Geochronology

- All are presumably included as part of Malani Igneous province earlier
- Later related to K-T Magmatism
- Palaeocene age suggested by Srivastava (1988).
- Subrahmanyam and Rao (1972) reported ~56 Ma age for Mer pluton
- Basu et al., (1993) gave 68.5 Ma age for Toa pluton and pyroxenite from Sarnu-Dandali Complex
- Rathore (1995) determined 64-66 Ma age for Tavidar suite
- Rathore et al., (1996) gave 70 Ma age for Mundwara Alkaline complex
- Hawaitte Basalt from Tavidar complex was also dated 64 Ma by Rathore and Venkatesan (1996)
- Deccan related magmatic ran for almost 6m.y. from 70-64 Ma