A SUBTHRUST PLAY IN THE SOUTHEASTERN POTWAR DEPRESSION

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Following a previous report*, more attention has been paid to a rather conspicuous seismic feature in the southeastern part of the Potwar Depression north of the Salt Range between Chakwal and Jhelum: over an area of more than 330 sq. km a sub/overthrust is displayed.

The following seismic lines have been the available rationale for the interpretation: Salt Range (SR) 4, 5, 10, 23, 24, 26, 27, 38 and 40, and Potwar (PTW) 785-4 and 805-4A; these lines, however, do not represent the full seismic coverage of the area discussed.

Over wide parts of the Potwar Depression the geological sequence top Eocene to top Salt Range Formation, which contains the main oil producing zones of the Potwar Province, displays a very characteristic high amplitude-low frequency band of strong seismic reflectors. North of the Salt Range and between the wells Hayal-1, Mahesian-1, and Qazian-1 this top Eocene to top Salt Range Formation seismic event can be observed in repetitive sequence on the above mentioned seismic lines (Figure 1). Doubtless, salt of the Salt Range Formation has acted as decollement for thrusting. The upper band (overthrust) has been mapped previously by Altenkirch et al (Figure 2) the lower band now has been subjected to a first attempt of mapping (Figure 3) and is commented upon as follows:

1. The subthrust sheet trends southwest-northeast and over a length of at least 35 km, *i.e.* between intersection of seismic lines SR-4 and 5 and seismic line PTW-4. In the southwest of the (still open) subthrust sheet, width is 20 km, it narrows to the northeast to approx. 6 km. In the northeast, its limit and longitudinal extent can not be clearly delineated with the available seismic lines. The by and large clearly delineated subthrust sheet covers about 330 sq. km.

2. With respect to the tops of Eocene, the subthrust sheet occurs about 400 to 1400 milliseconds (ms) two-way time (TWT) below the overthrusted package and at levels between 1300 to 2200 ms TWT below mean sea level, *i.e.* within attractive drilling depths.

3. Top Eocene isochrones of the subthrust sheet do not follow the top Eocene isochrone pattern of the overthrust sheet.

4. The subthrust sheet is judged as a promising petroleum geological play deserving further attention. There are several indications for structural highs (dip and fault-closures).

The top Eocene to top Salt Range Formation subthrust sheet is at present covered with a semi-reconnaissance seismic grid only. Since this subthrust play looks promising, further seismic for a more precise delineation of the subthrust sheet and a prospect inventory is needed.

Acknowledgement

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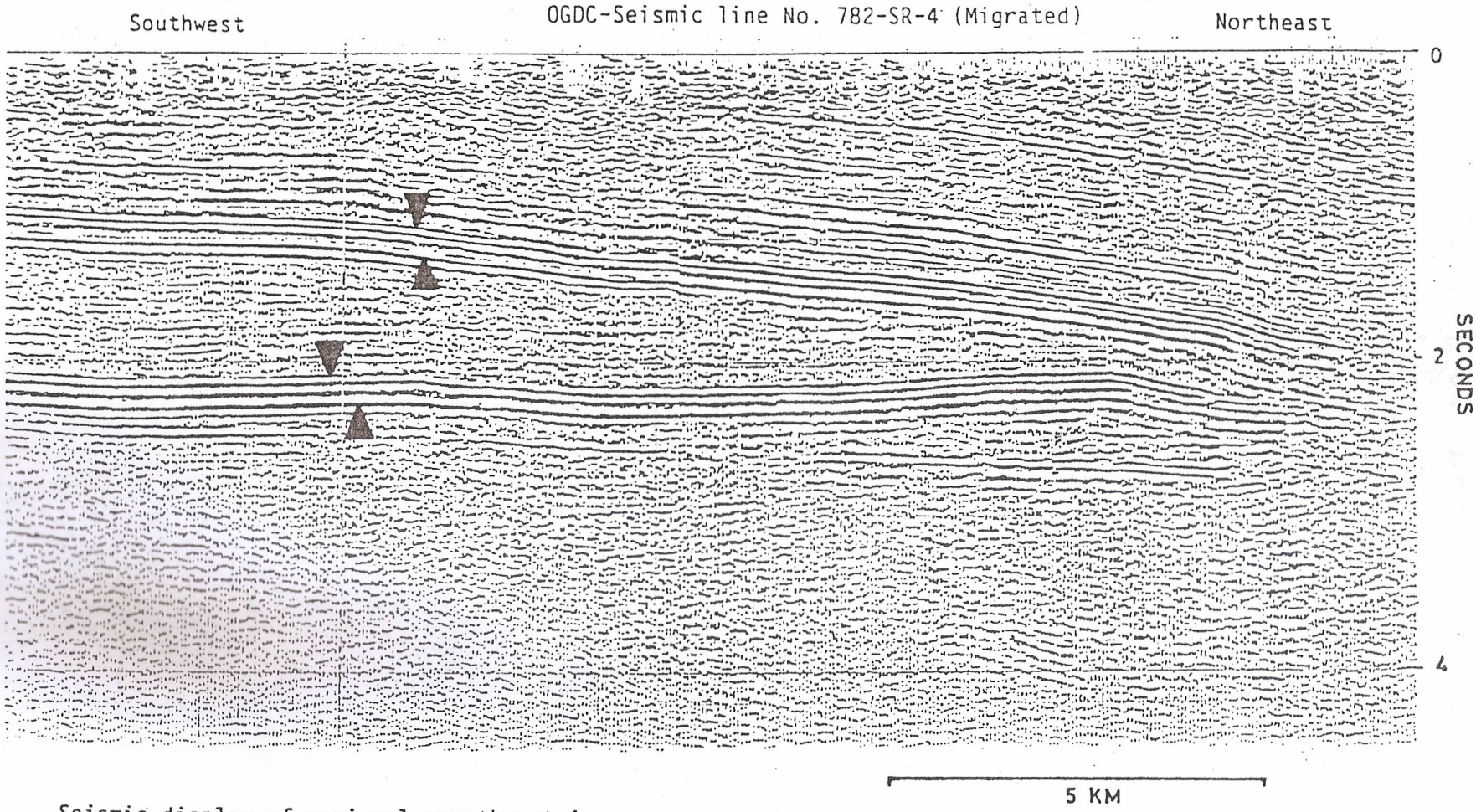
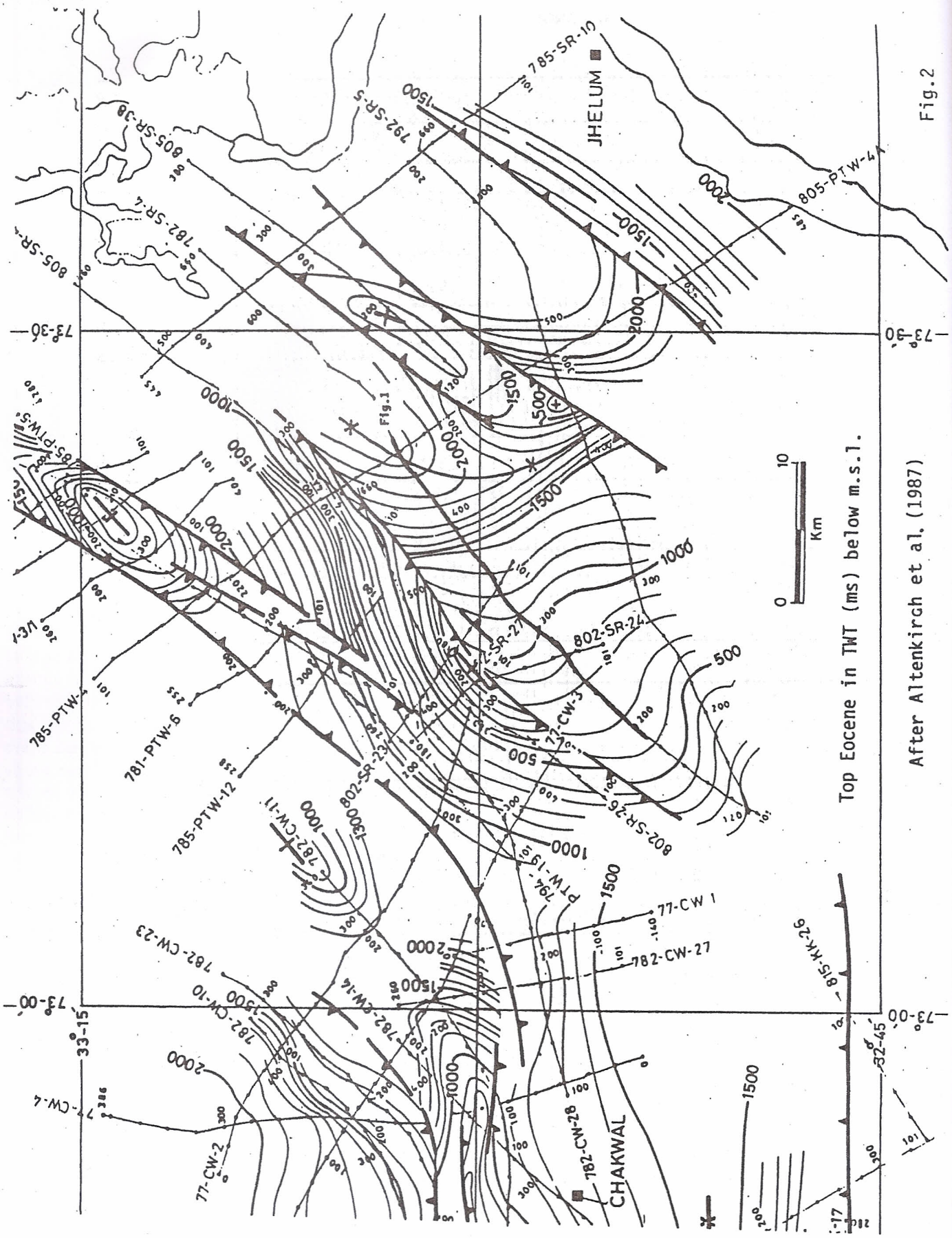
*Seismic interpretation in Potwar Basin by J. Altenkirch (German Geological Advisory Group), Jalil Ahmad and Arshad Majeed (HDIP), Sept. 1987: HDIP's unpublished report.



Seismic display of regional overthrust in the southeastern Potwar Depression (for location see figure 3).

Seismic datum : 350 m AMSL

Fig.1


JHELUM
CHAKWAL
785-SR-10
792-SR-5
805-SR-38
782-SR-4
805-PTW-4
805-PTW-5
785-PTW-4
781-PTW-5
785-PTW-12
782-CW-11
782-CW-23
782-CW-10
782-CW-14
77-CW-4
77-CW-2
782-CW-28
794-PTW-15
77-CW-1
782-CW-27
802-SR-24
77-CW-3
802-SR-26
802-SR-27
802-SR-23
802-SR-20B
815-KK-26
Fig.1
Fig.2
73-30
73-00
33-15
32-45
0
10
Km
Top Eocene in TWT (ms) below m.s.l.
After Altenkirch et al, (1987)

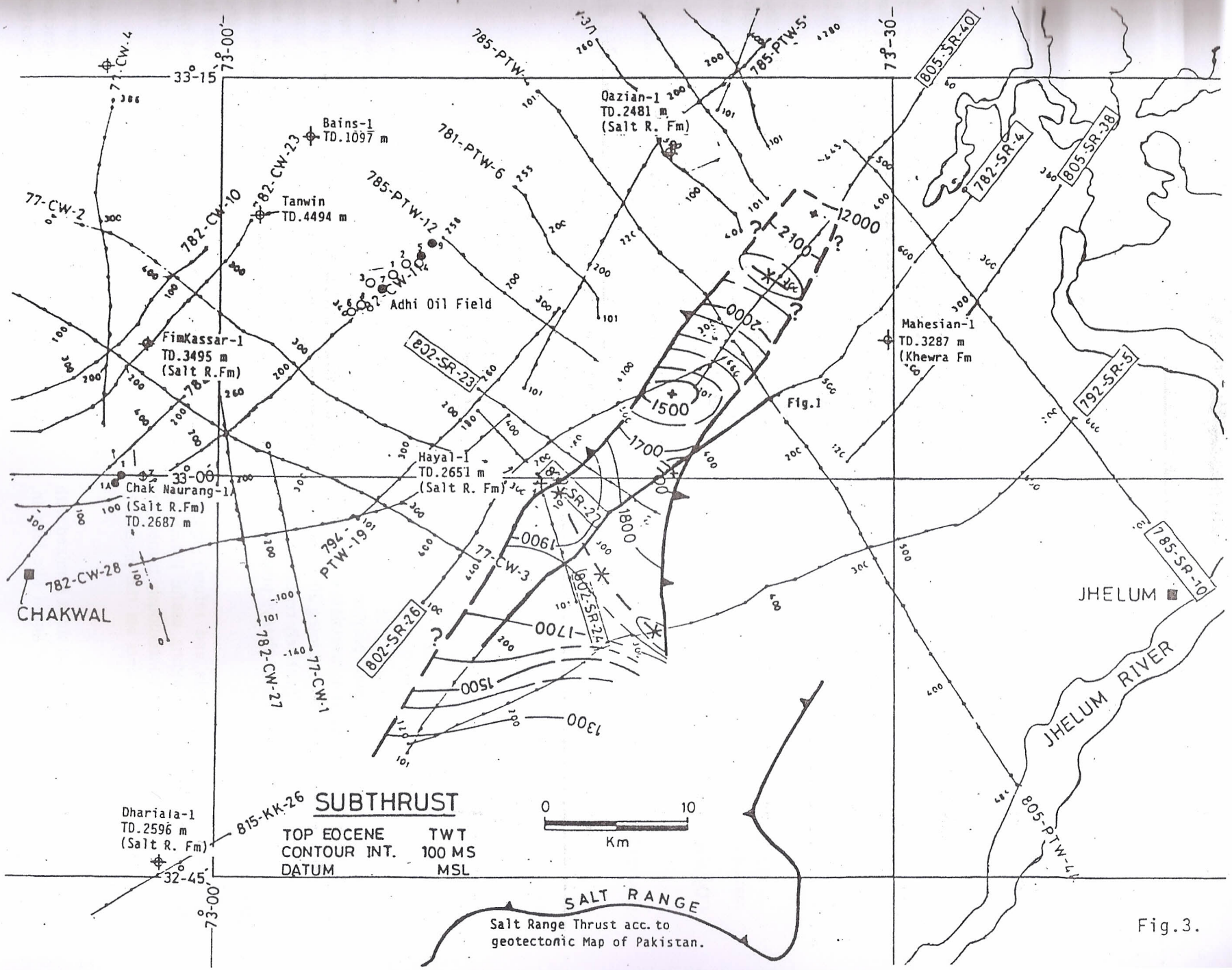

33-15
73-00
73-30
33-00
32-45
Bains-1
TD.1097 m
Tanwin
TD.4494 m
Adhi Oil Field
Qazian-1
TD.2481 m
(Salt R. Fm)
Fim Kassar-1
TD.3495 m
(Salt R.Fm)
Chak Naurang-1
(Salt R.Fm)
TD.2687 m
Hayal-1
TD.2651 m
(Salt R. Fm)
Mahesian-1
TD.3287 m
(Khewra Fm
Dhariala-1
TD.2596 m
(Salt R. Fm)
CHAKWAL
JHELUM
JHELUM RIVER
SALT RANGE
Salt Range Thrust acc. to
geotectonic Map of Pakistan.
SUBTHRUST
TOP EOCENE TWT
CONTOUR INT. 100 MS
DATUM MSL
0 10
Km
Fig.1
77-CW-4
77-CW-2
782-CW-23
782-CW-10
785-PTW-12
781-PTW-6
785-PTW-5
805-SR-40
805-SR-38
782-SR-4
792-SR-5
785-SR-10
802-SR-23
802-SR-22
802-SR-24
802-SR-26
782-CW-28
782-CW-27
77-CW-1
77-CW-3
794-PTW-19
815-KK-26
805-PTW-1
1500
1700
1800
1900
2000
2100
12000
1700
1500
1300

Fig.3.