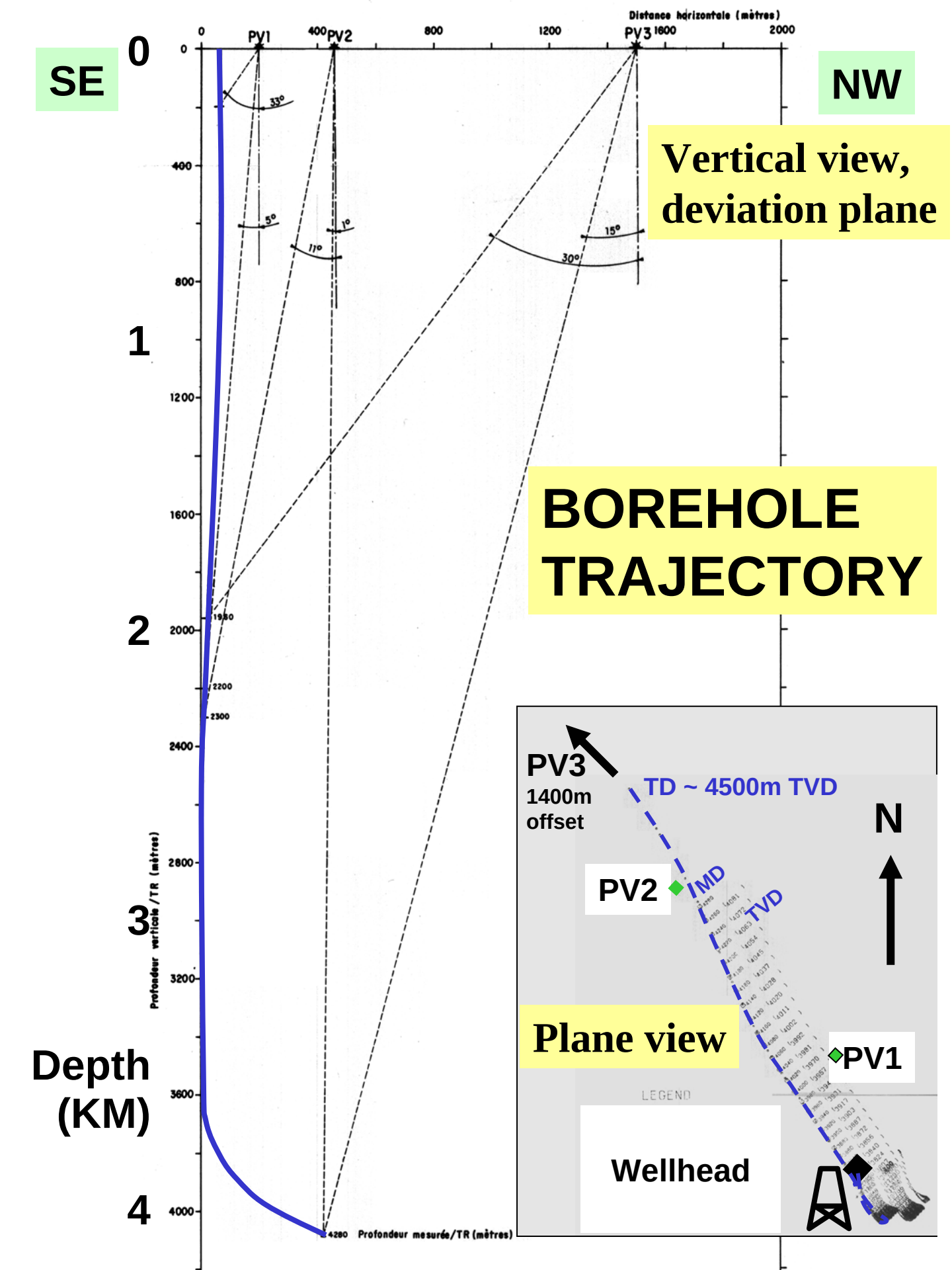
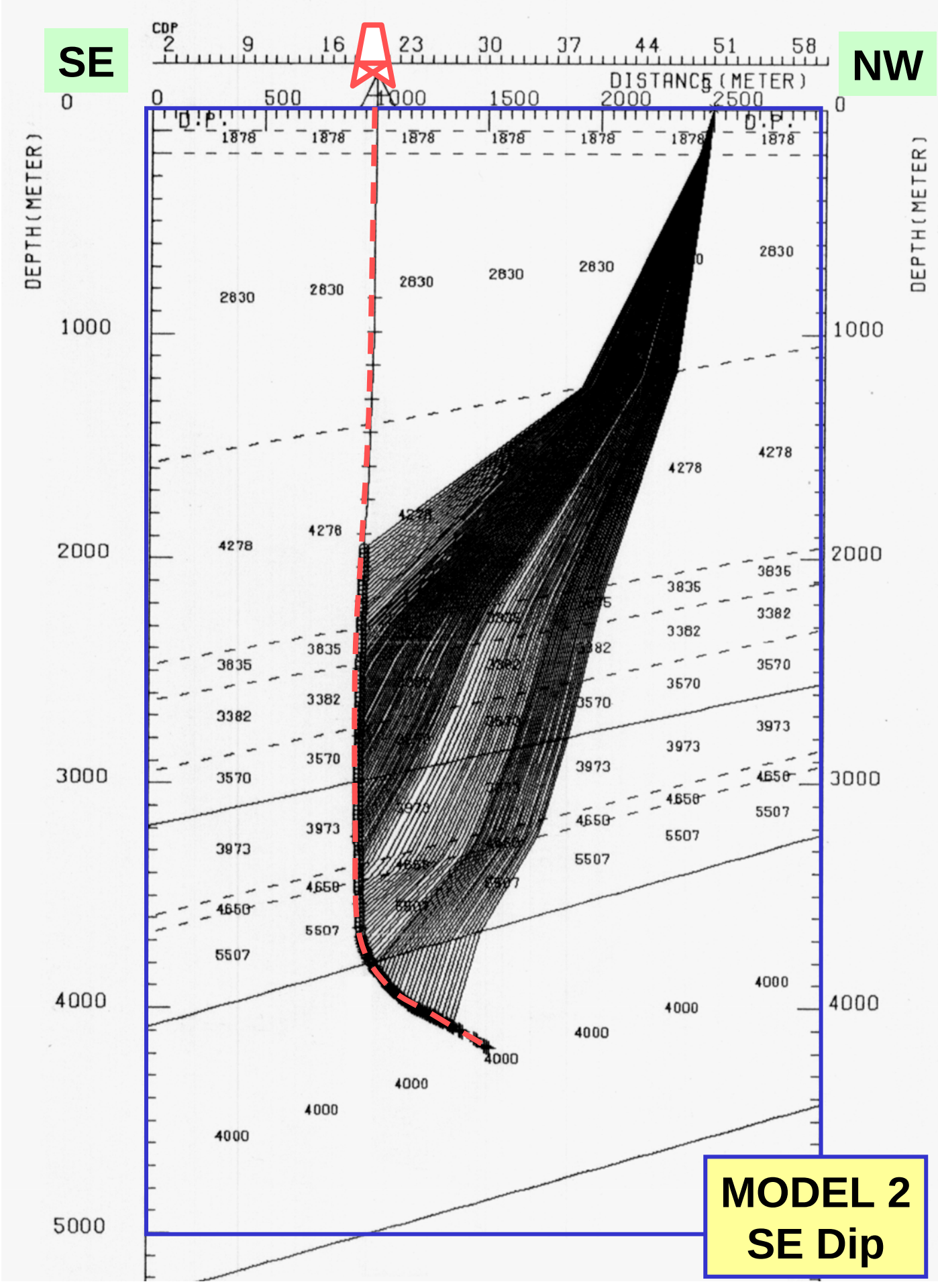
Isotropic VSP processing of oriented 3 Components

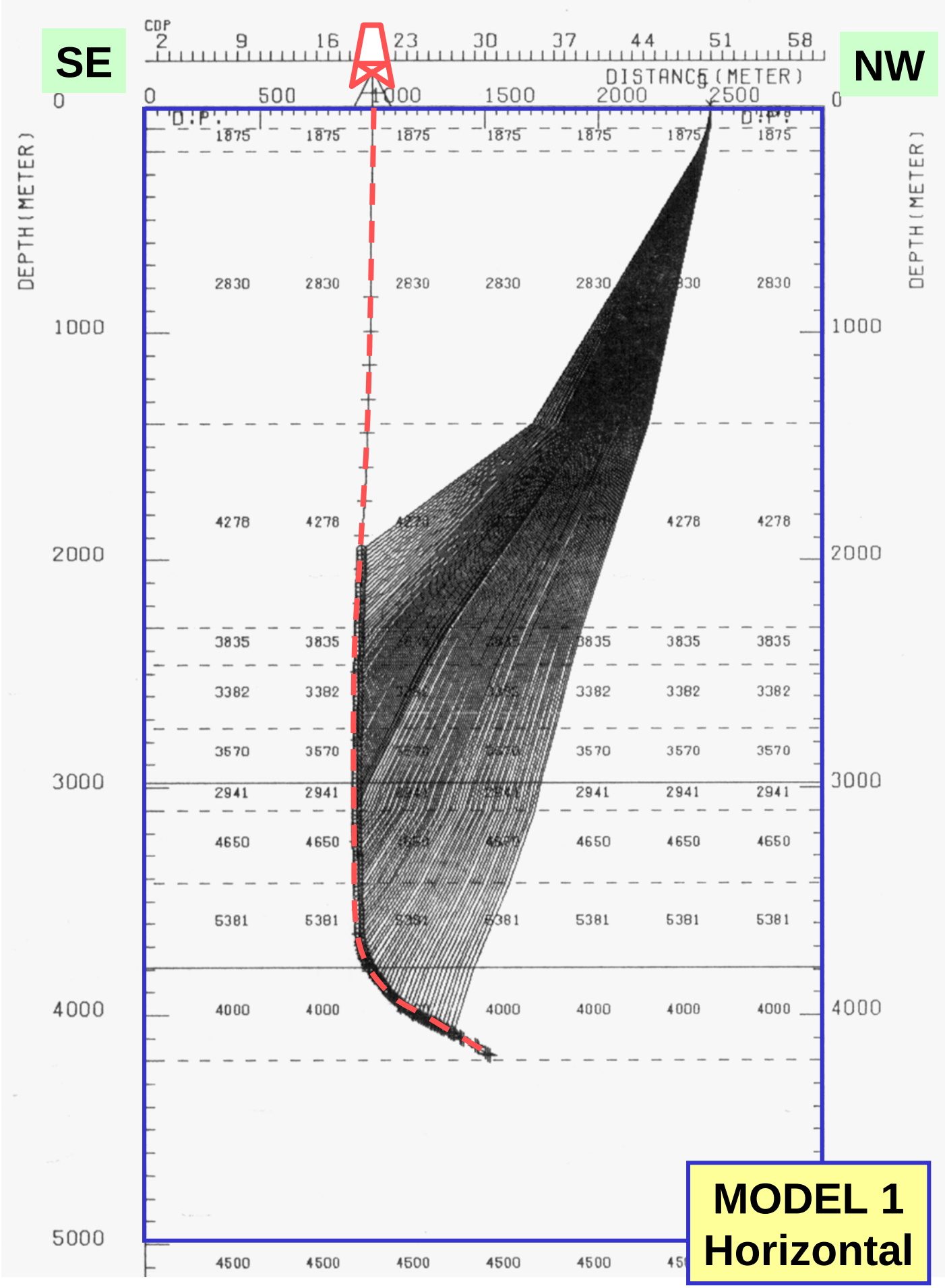
Early example of 3C orientation and extraction of P-P reflection polarisation aimed to improved reliability of structural dip and structural imaging of the borehole vicinity in a deep well; onshore Offset - VSP dataset, vibroseis

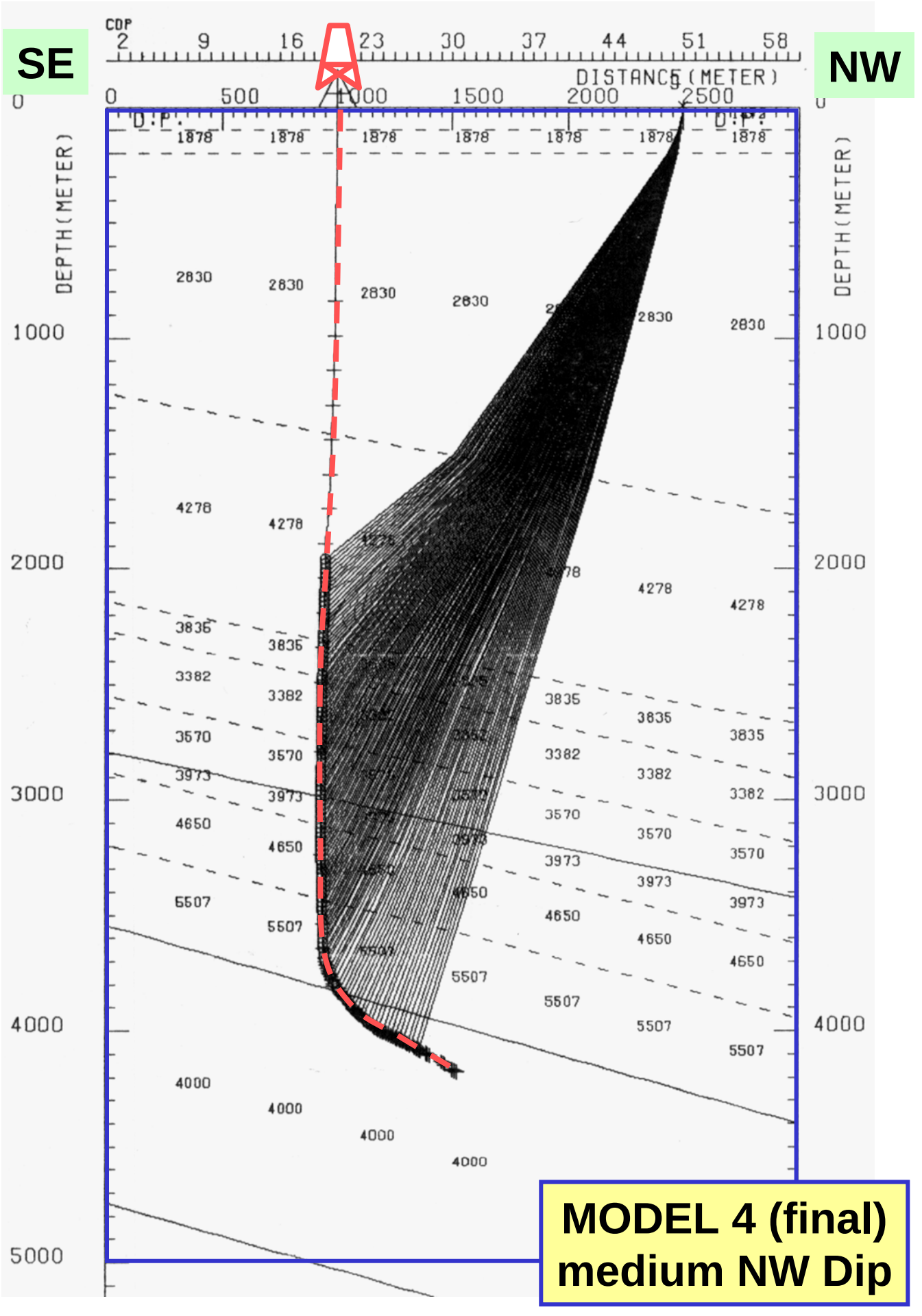
by H. Japiot, C. Goloubinoff, C. Navillle, CGG, Massy

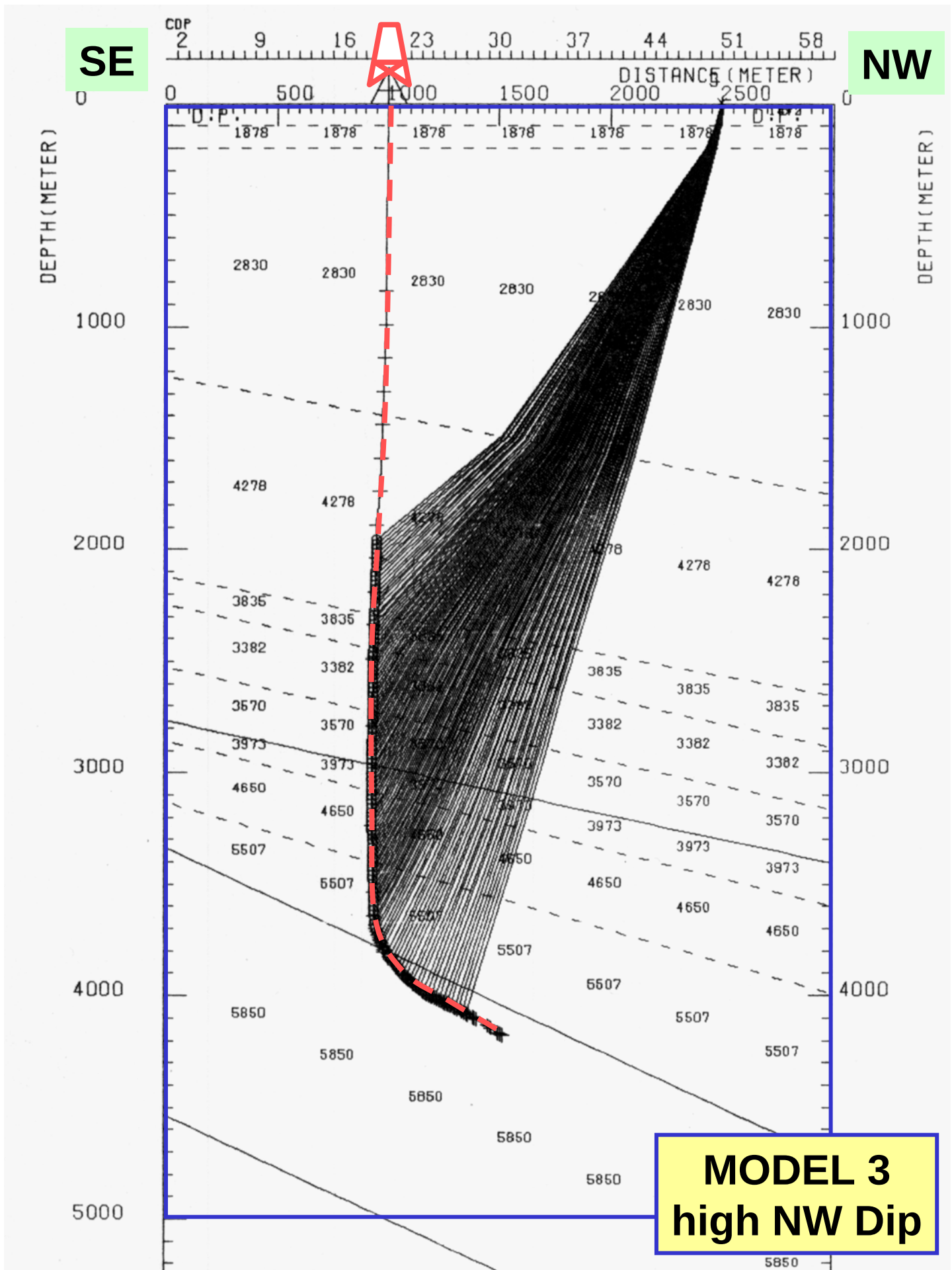
courtesy of SNEA-P – BOUSSENS, France, 1989

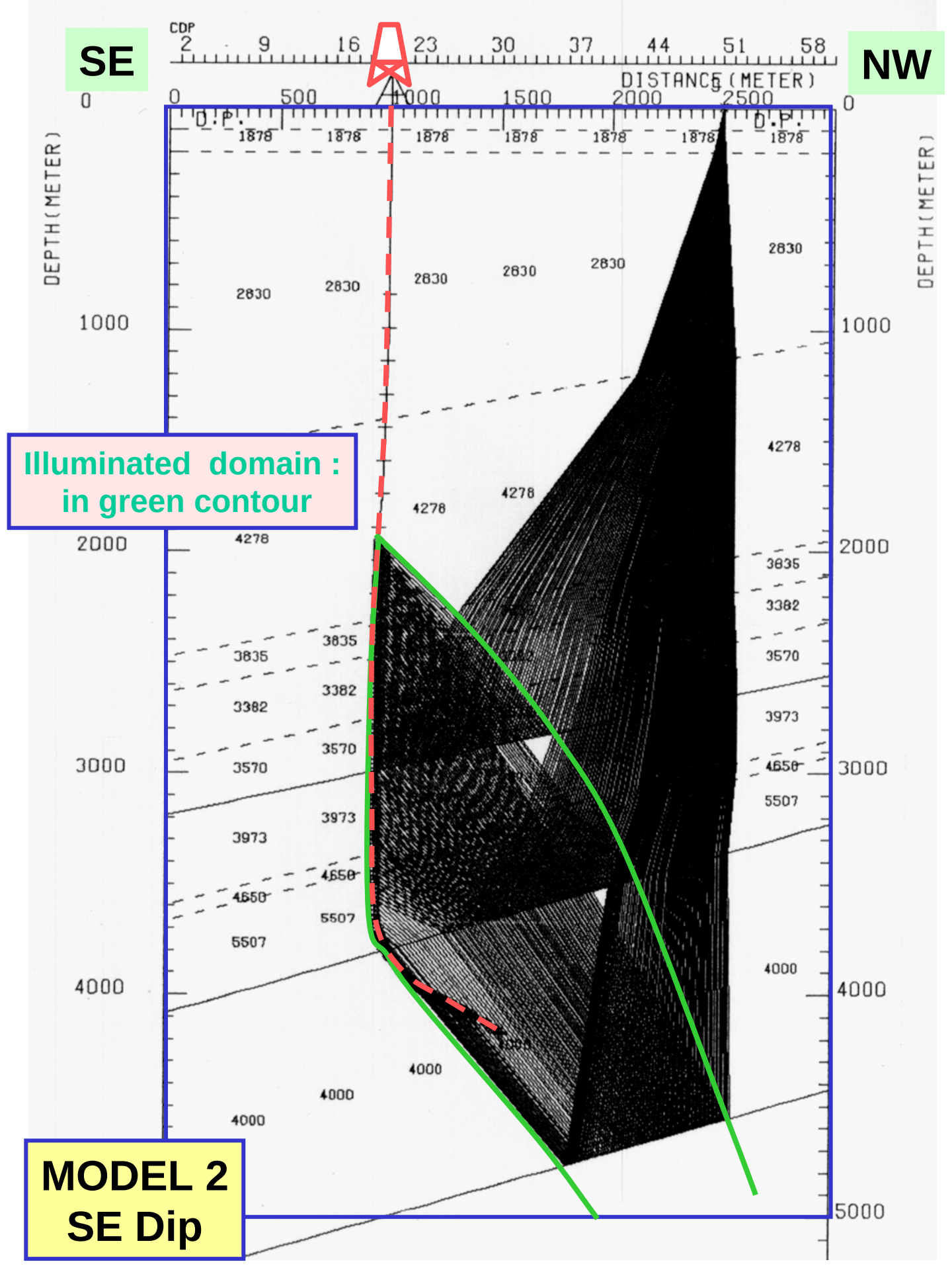

SE
NW
Vertical view, deviation plane
BOREHOLE TRAJECTORY
Distance horizontale (mètres)
PV1
PV2
PV3
0
400
800
1200
1600
2000
33°
5°
1°
17°
15°
30°
Profondeur verticale /TR (mètres)
Profondeur mesurée/TR (mètres)
4280
Depth (KM)
0
1
2
3
4
PV3
1400m offset
TD ~ 4500m TVD
N
PV2
MD
TVD
Plane view
PV1
LEGEND
Wellhead

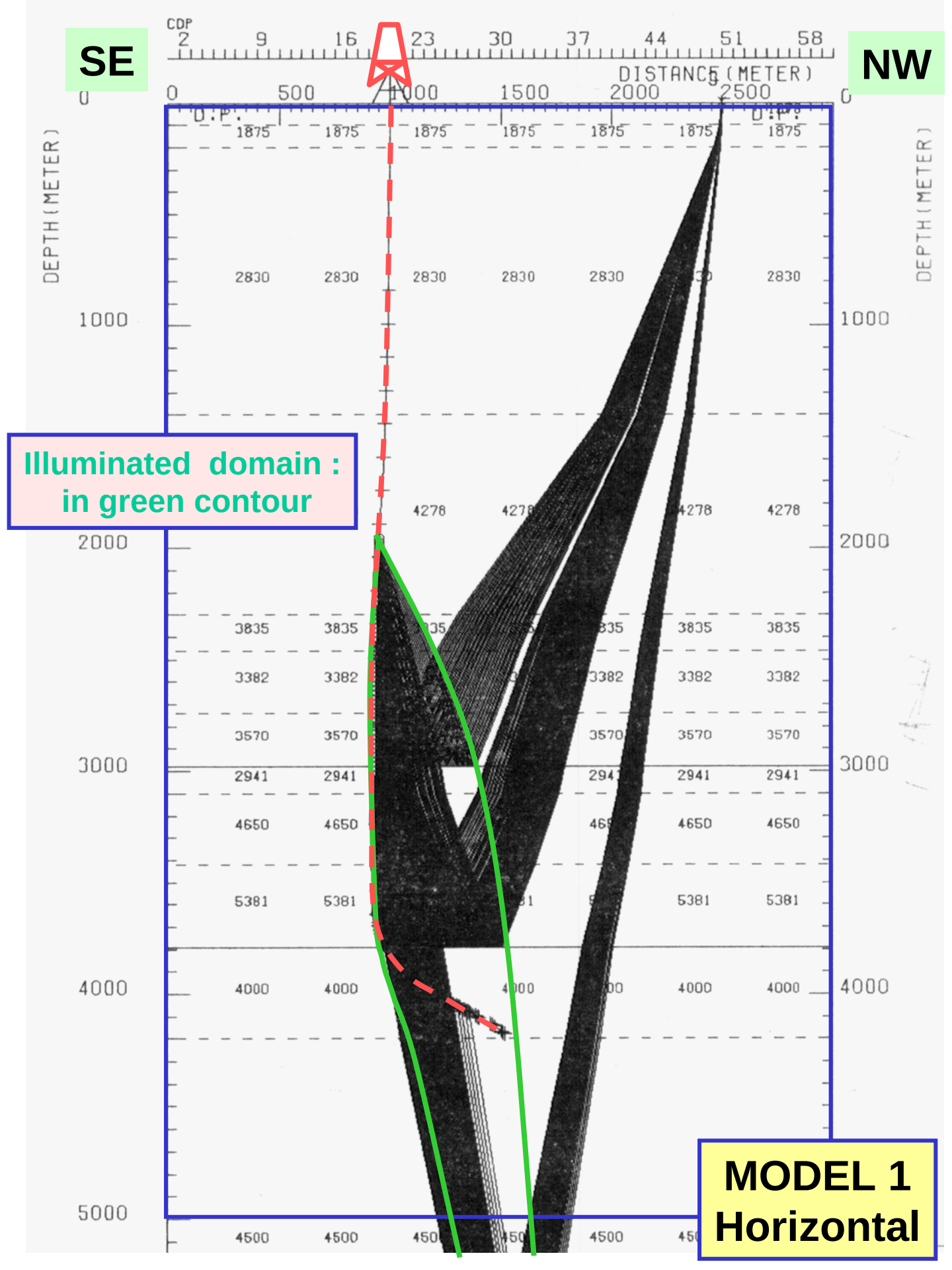

SE
NW
CDP
2 9 16 23 30 37 44 51 58
DISTANCE (METER)
0 500 1000 1500 2000 2500
D.P.
1878
2830
4278
3835
3382
3570
3973
4650
5507
4000
DEPTH (METER)
0
1000
2000
3000
4000
5000
MODEL 2
SE Dip

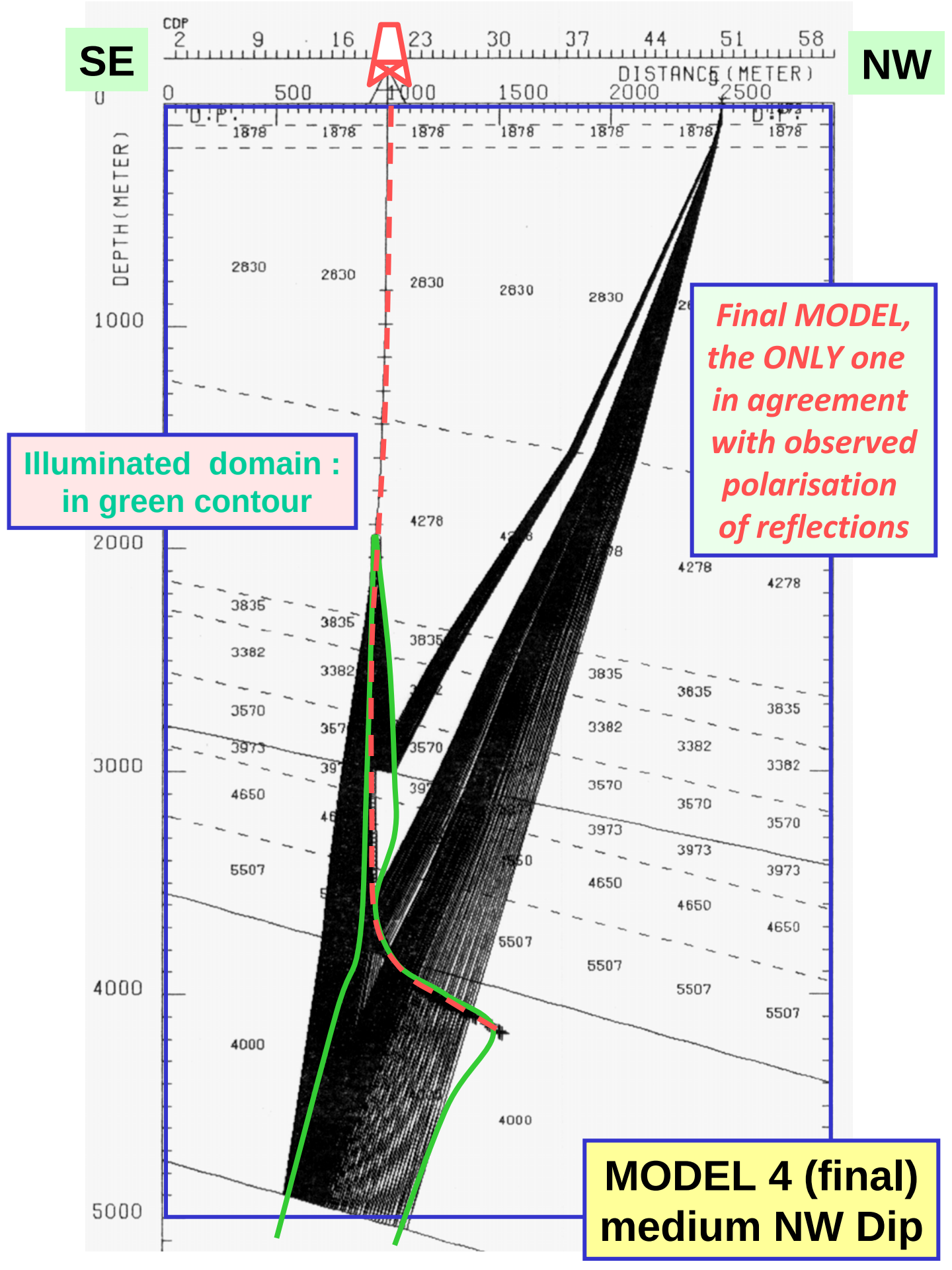

SE
NW
CDP
2
9
16
23
30
37
44
51
58
DISTANCE (METER)
0
500
1000
1500
2000
2500
DEPTH (METER)
1000
2000
3000
4000
5000
1875
2830
4278
3835
3382
3570
2941
4650
5381
4000
4500
MODEL 1
Horizontal

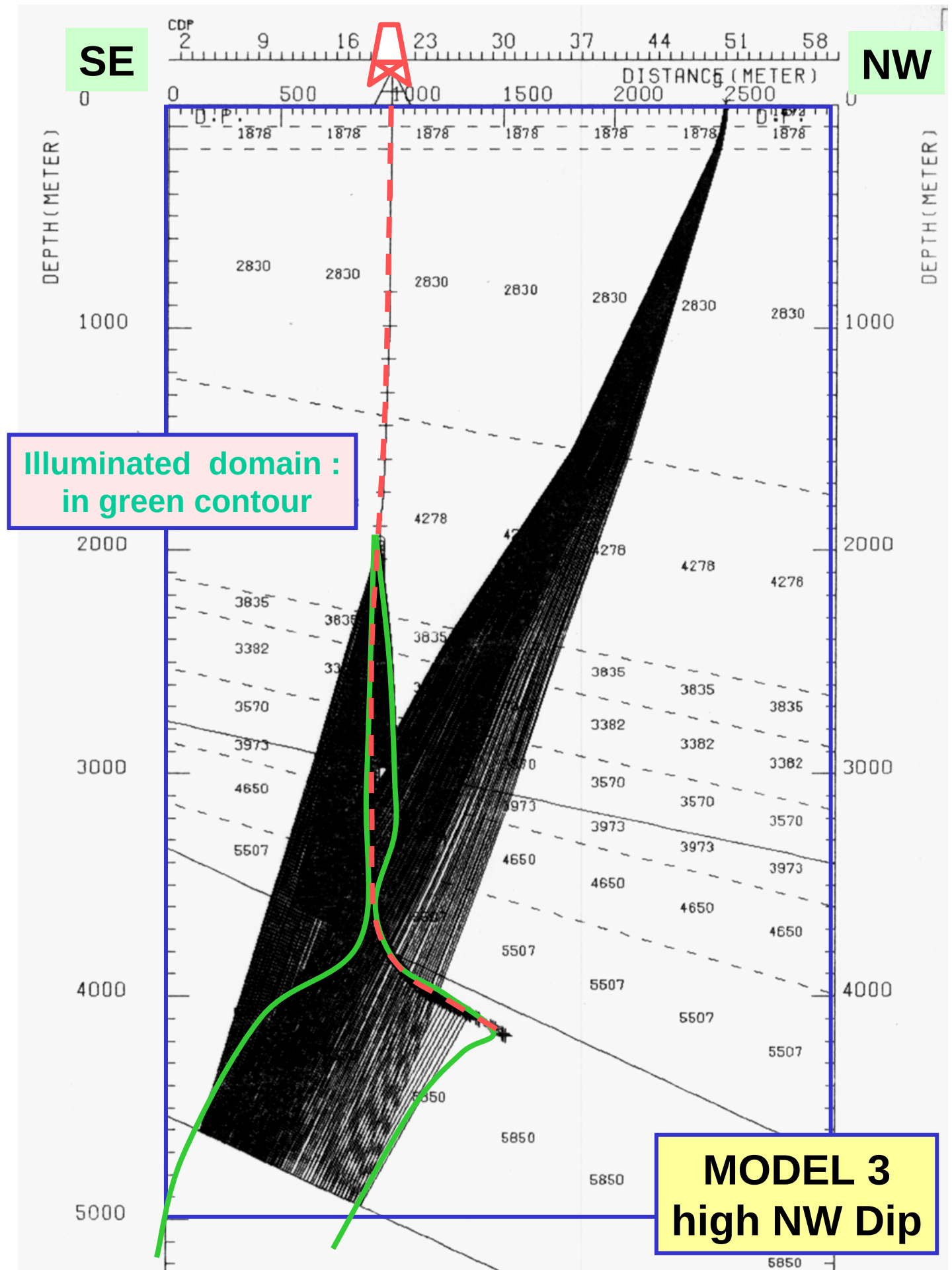

SE
NW
CDP
2 9 16 23 30 37 44 51 58
DISTANCE (METER)
0 500 1000 1500 2000 2500
DEPTH (METER)
1000
2000
3000
4000
5000
1878
2830
4278
3835
3382
3570
3973
4650
5507
4000
MODEL 4 (final)
medium NW Dip


SE
NW
CDP
2
9
16
23
30
37
44
51
58
DISTANCE (METER)
0
500
1000
1500
2000
2500
DEPTH (METER)
1000
2000
3000
4000
5000
1878
2830
4278
3835
3382
3570
3973
4650
5507
5850
MODEL 3
high NW Dip


SE
NW
CDP
2 9 16 23 30 37 44 51 58
DISTANCE (METER)
0 500 1000 1500 2000 2500
DEPTH (METER)
0 1000 2000 3000 4000 5000
O.P.
1878
2830
4278
3835
3382
3570
3973
4650
5507
4000
Illuminated domain :
in green contour
MODEL 2
SE Dip

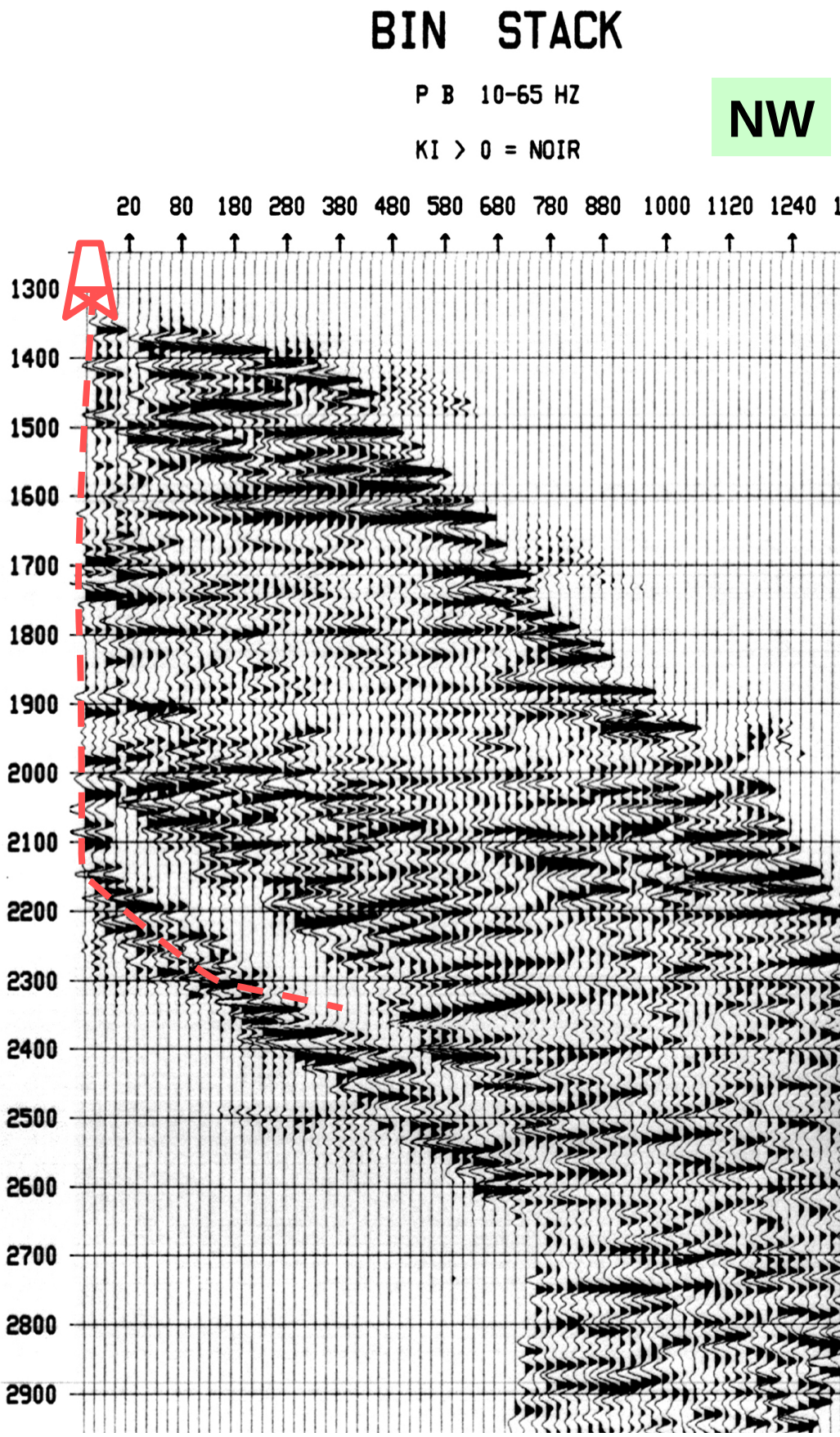

SE
NW
CDP
2
9
16
23
30
37
44
51
58
DISTANCE (METER)
0
500
1000
1500
2000
2500
DEPTH (METER)
1000
2000
3000
4000
5000
1875
2830
4278
3835
3382
3570
2941
4650
5381
4000
4500
Illuminated domain :
in green contour
MODEL 1
Horizontal


SE
NW
CDP
2 9 16 23 30 37 44 51 58
DISTANCE (METER)
0 500 1000 1500 2000 2500
DEPTH (METER)
0
1000
2000
3000
4000
5000
1878
2830
4278
3835
3382
3570
3973
4650
5507
4000
Illuminated domain : in green contour
Final MODEL, the ONLY one in agreement with observed polarisation of reflections
MODEL 4 (final) medium NW Dip


SE
NW
CDP
2 9 16 23 30 37 44 51 58
DISTANCE (METER)
0 500 1000 1500 2000 2500
DEPTH (METER)
1000
2000
3000
4000
5000
Illuminated domain :
in green contour
MODEL 3
high NW Dip

SE

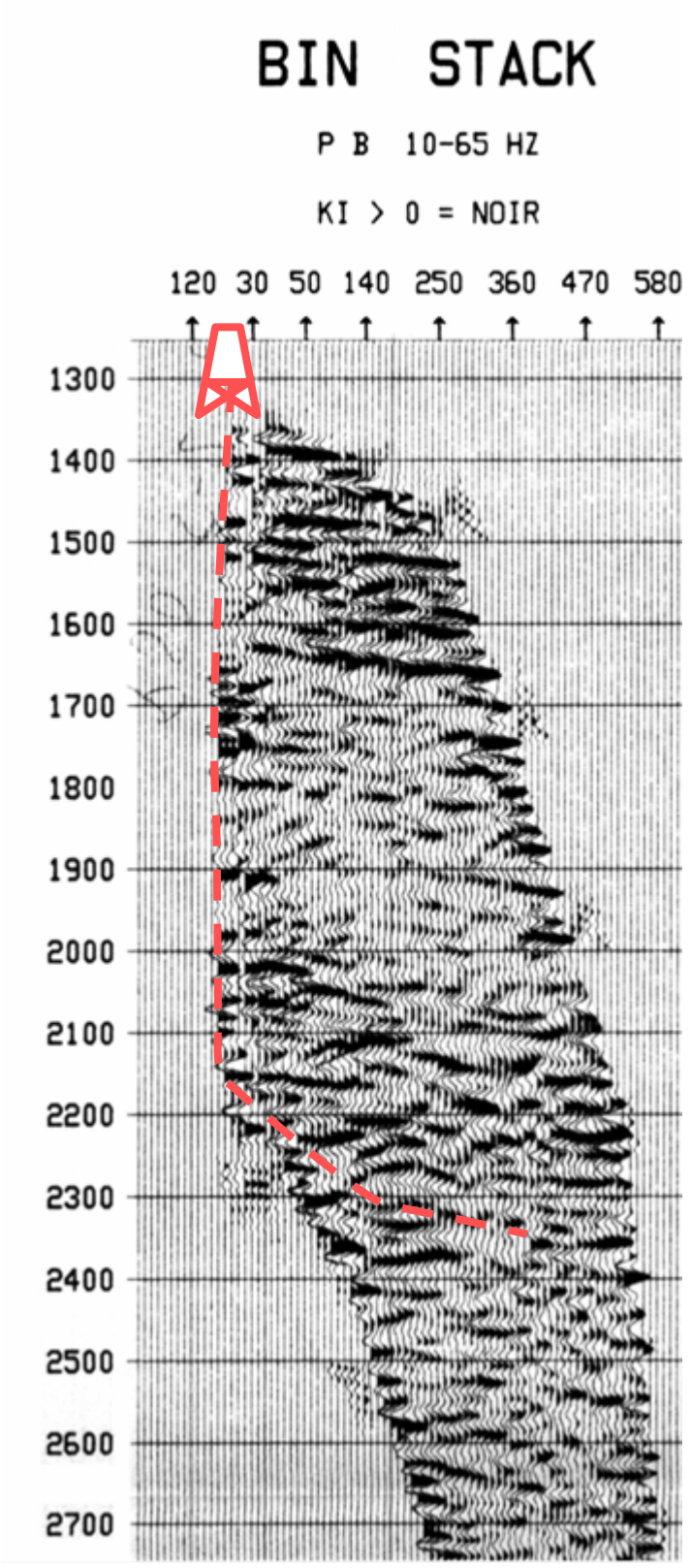
NW



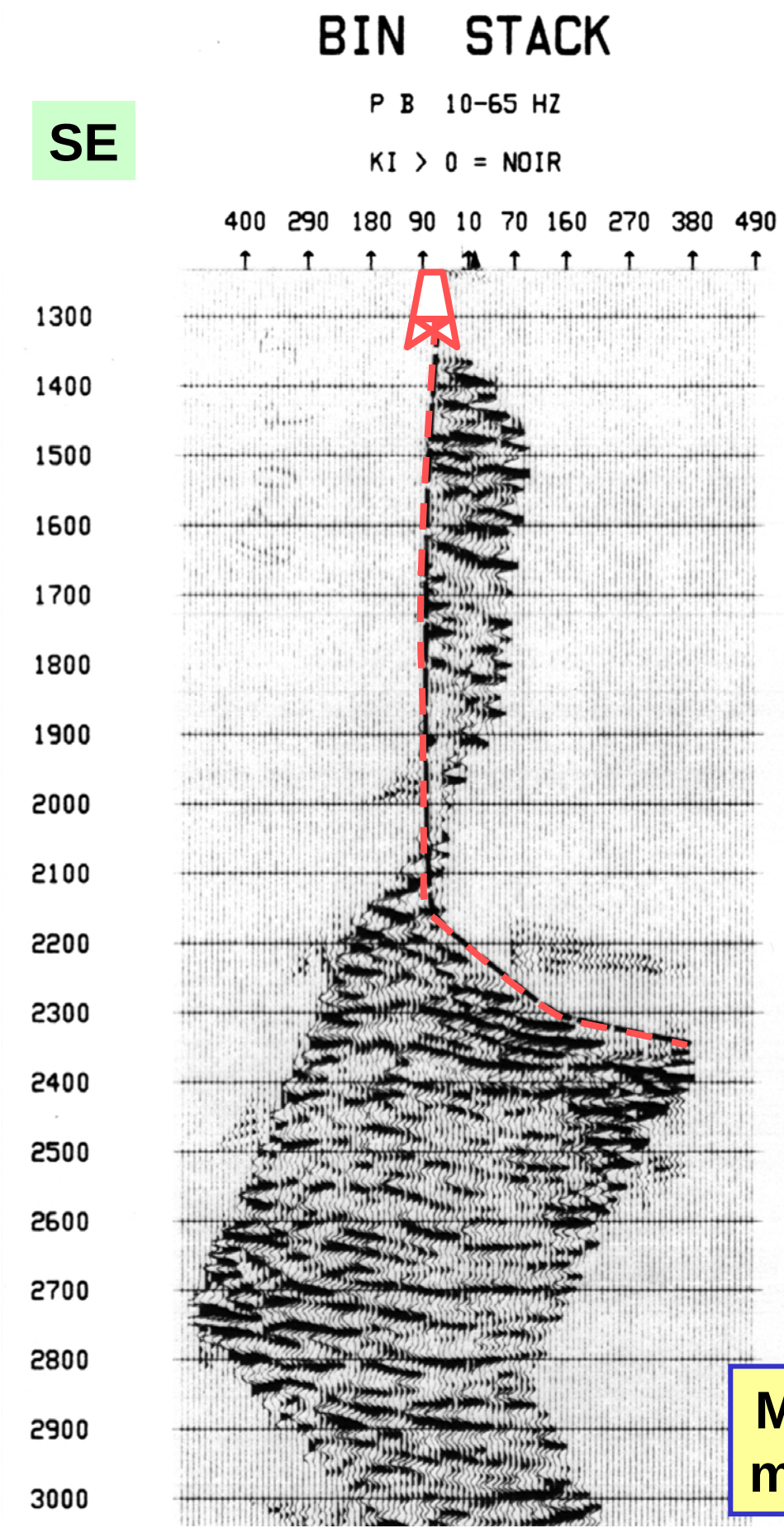
MODEL 2
SE Dip

SE

NW



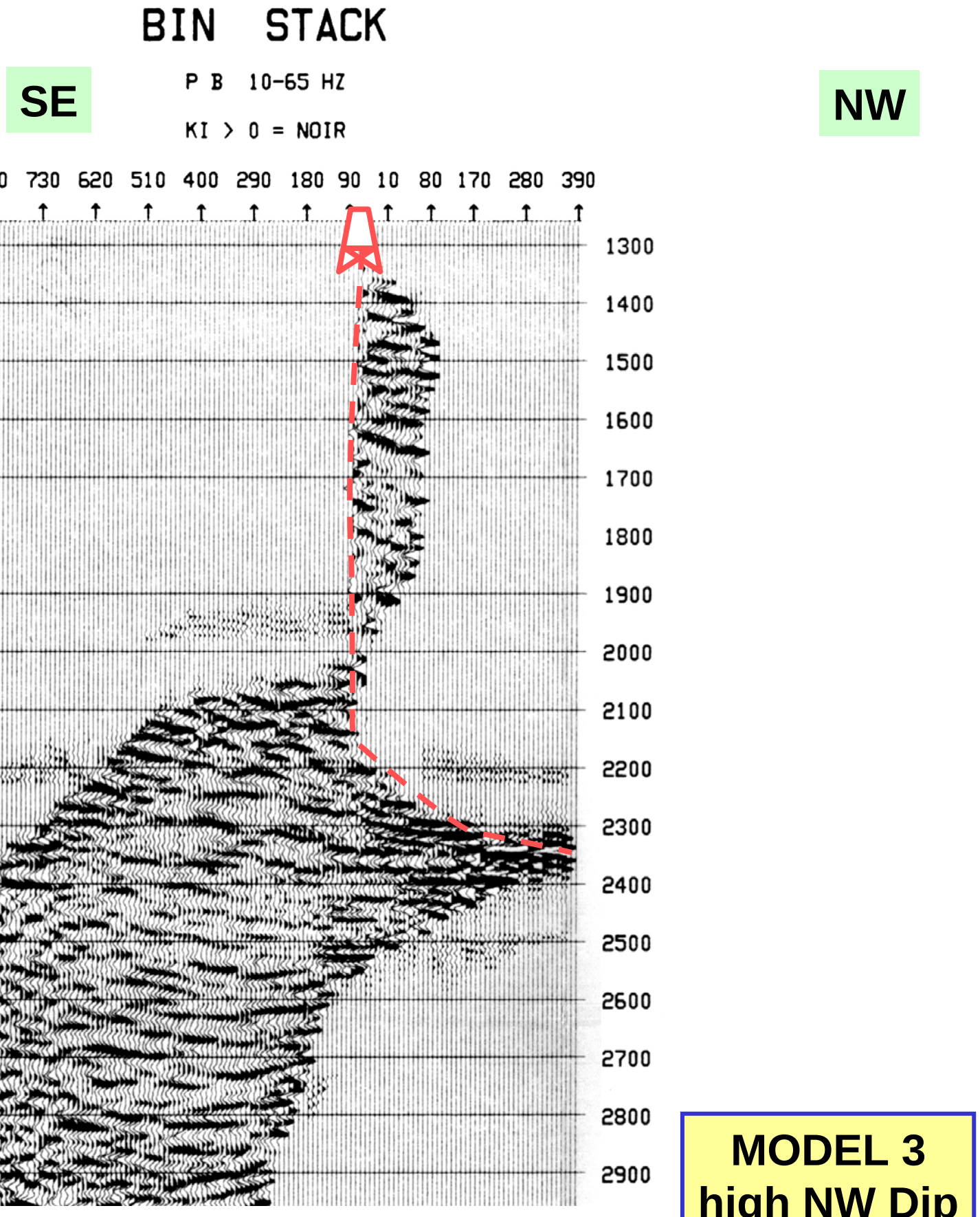
MODEL 1
Horizontal



SE

NW

MODEL 4 (final)
medium NW Dip



MODEL 3
high NW Dip