The rapid drift of the Indian tectonic plate

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Breakup and early seafloor spreading between India and Antarctica

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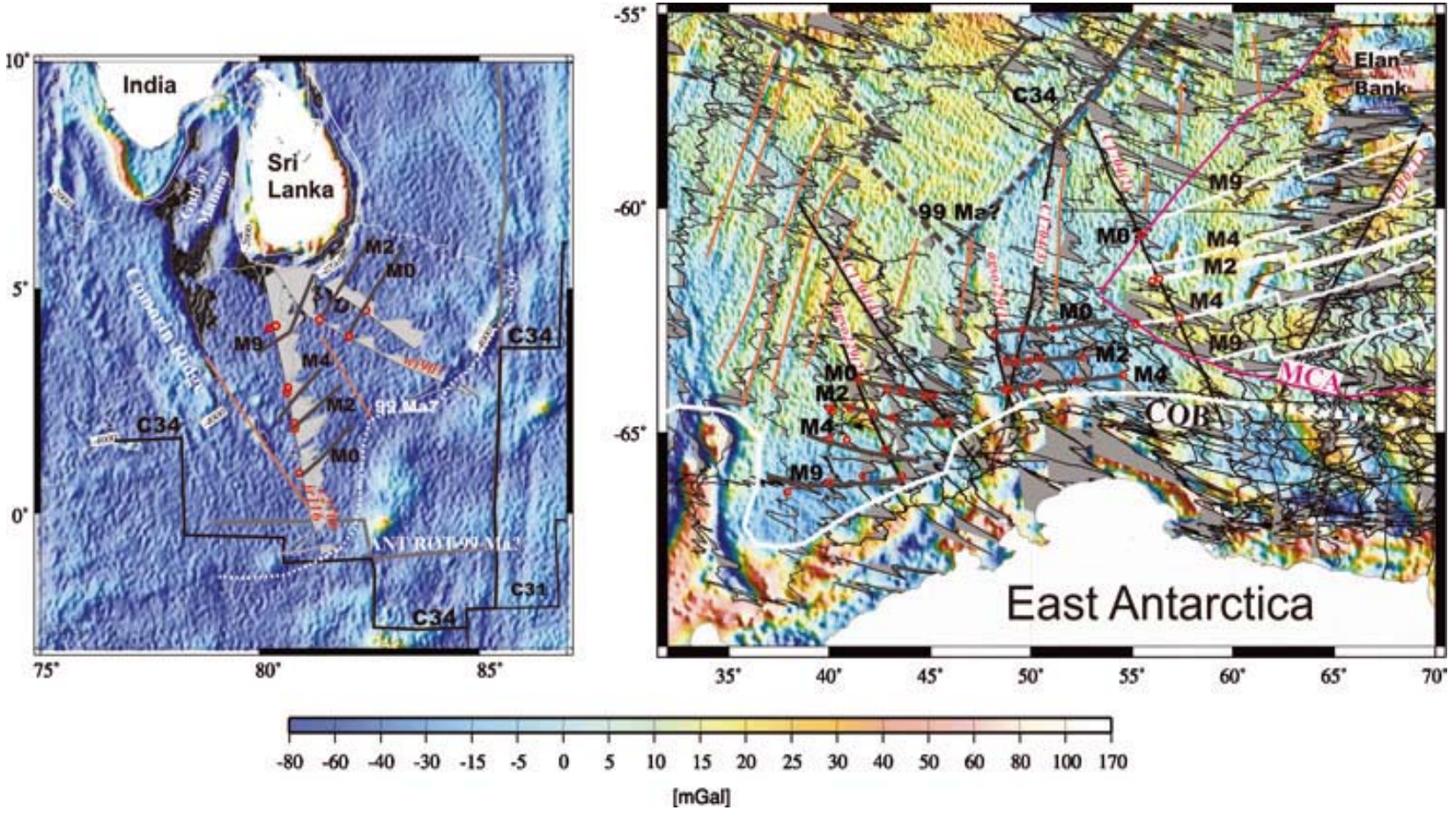


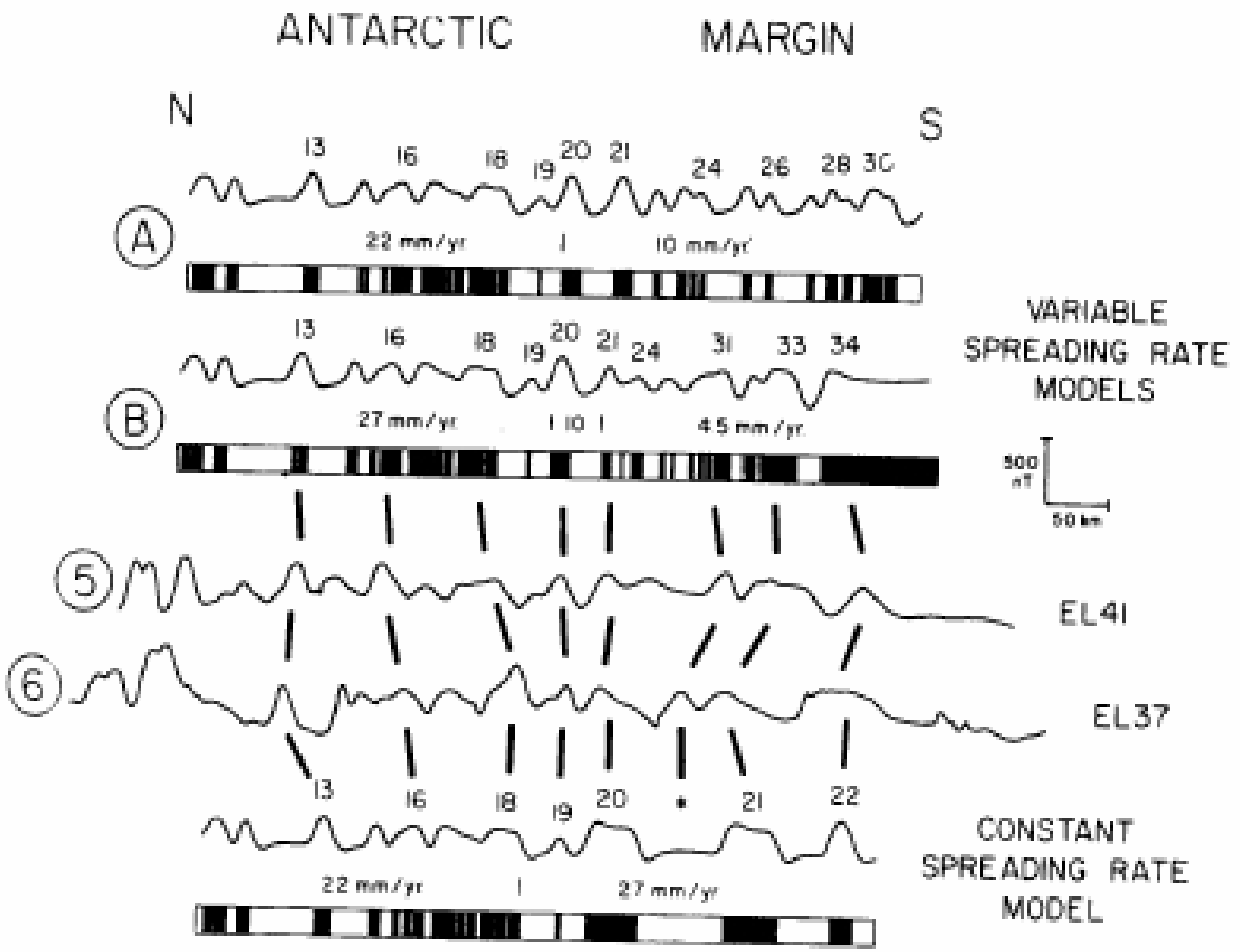
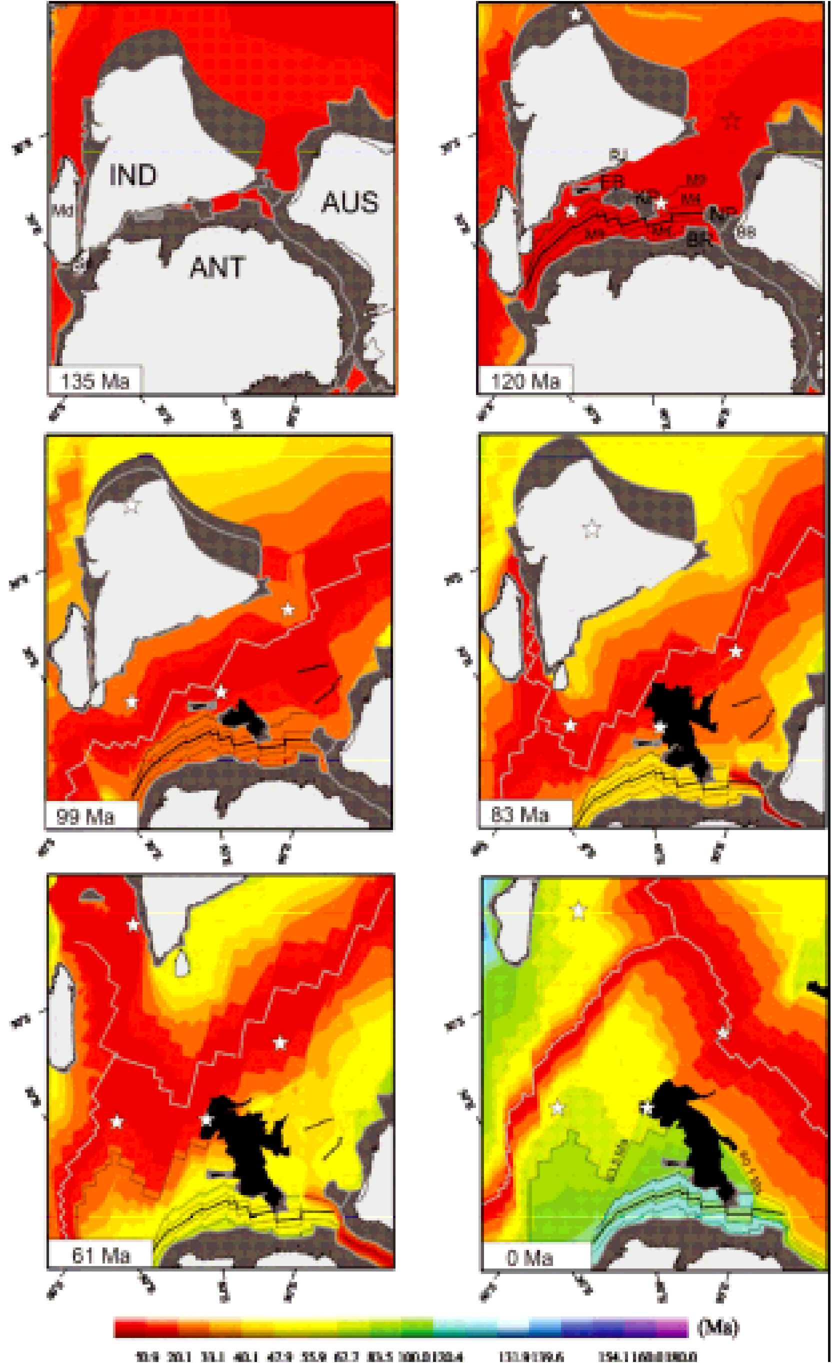
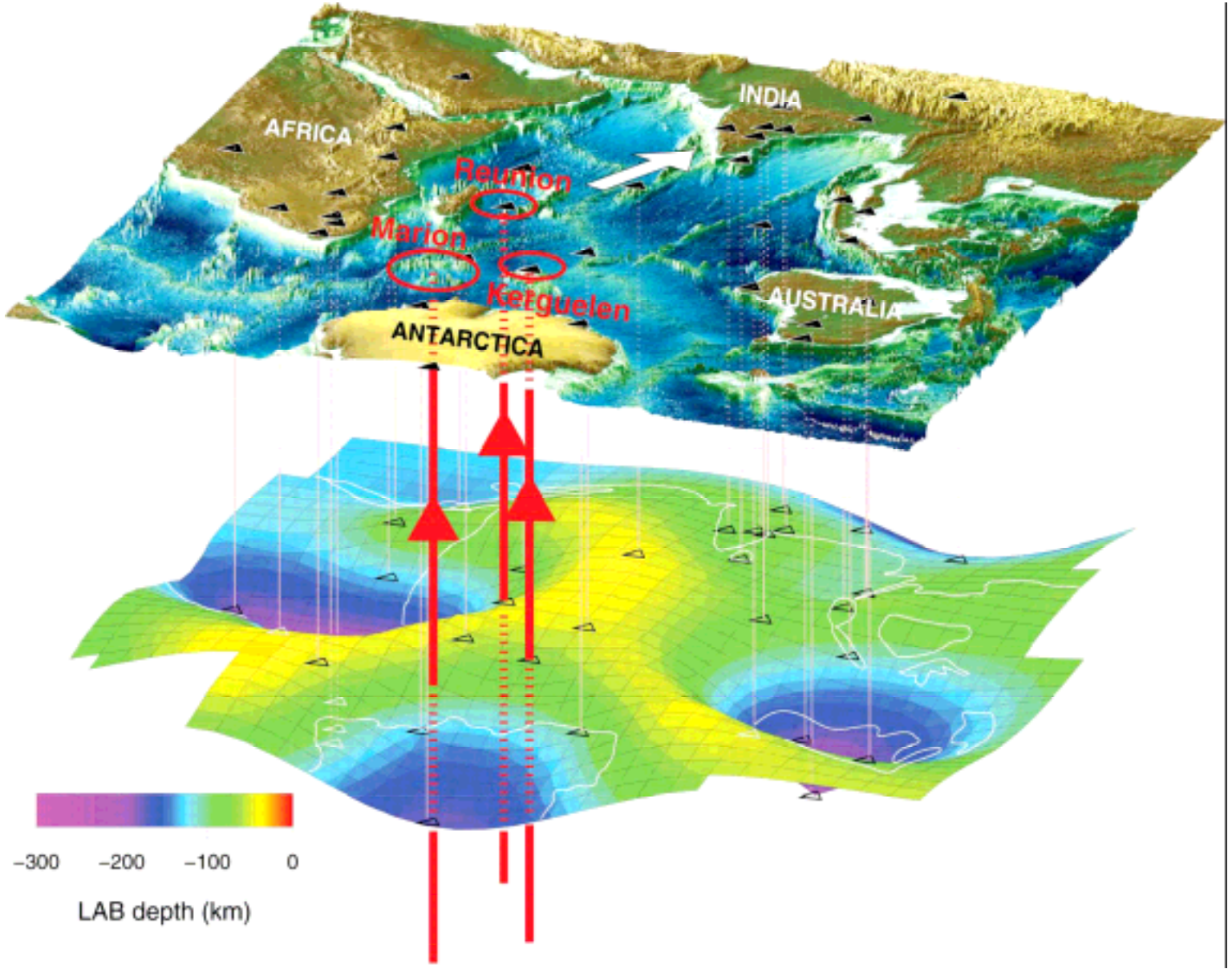
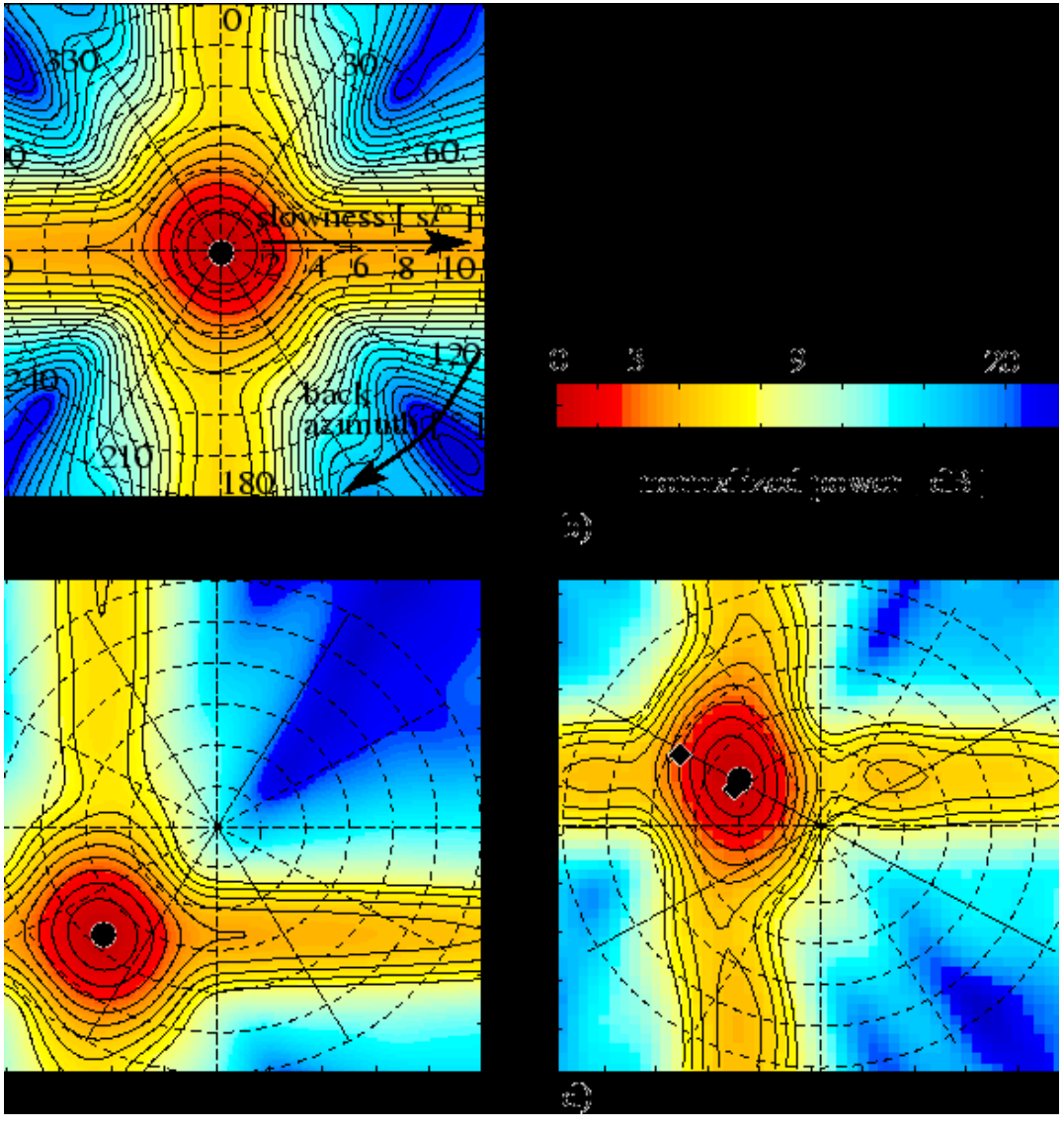


Fig. 5. Representative magnetic profiles from the conjugate Antarctic margin compared to variable spreading rate models A and B (top) and a model based on the original anomaly identifications (bottom). Model B is our preferred model. Model parameters same as in Fig. 4 except $I_0 = -87°$, $D_0 = -39°$.

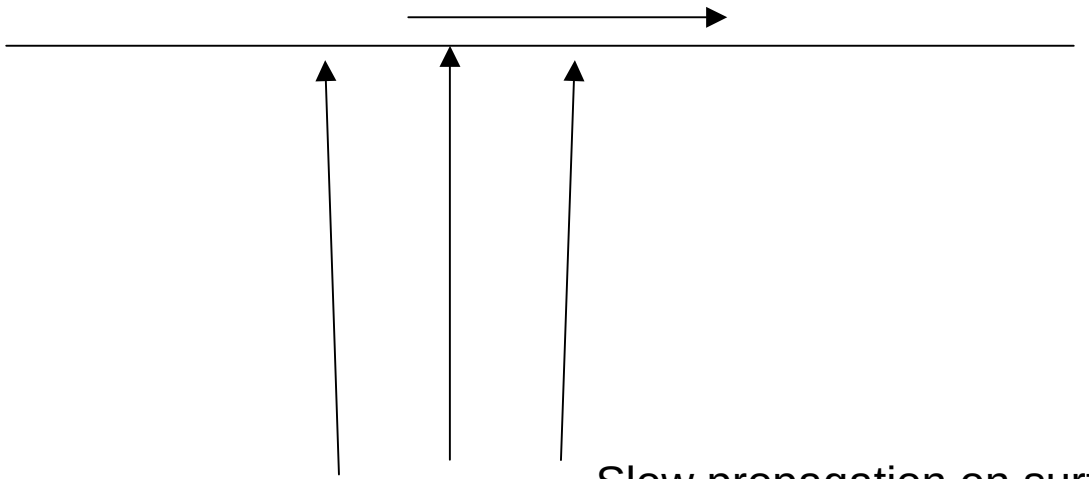

IND
AUS
ANT
135 Ma
120 Ma
NP
BR
99 Ma
83 Ma
61 Ma
0 Ma
(Ma)


AFRICA
INDIA
Reunion
Marion
Kerguelen
AUSTRALIA
ANTARCTICA
−300
−200
−100
0
LAB depth (km)

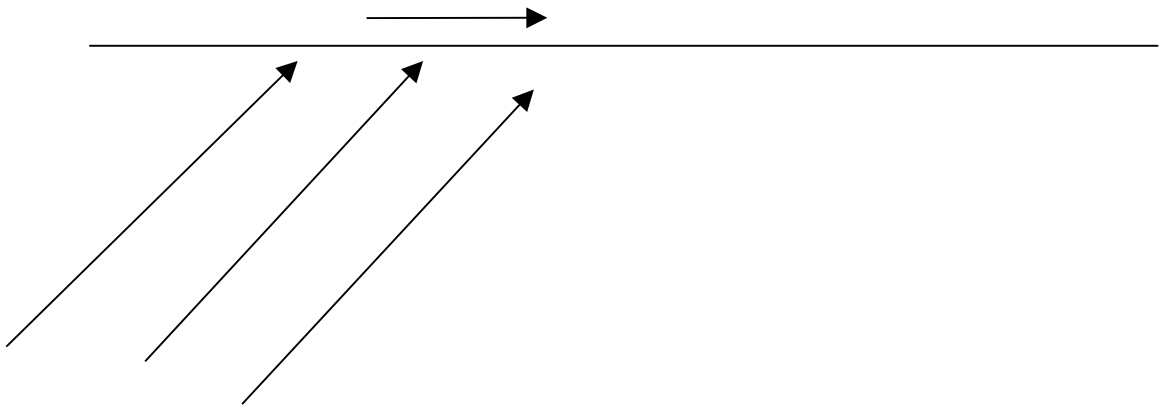


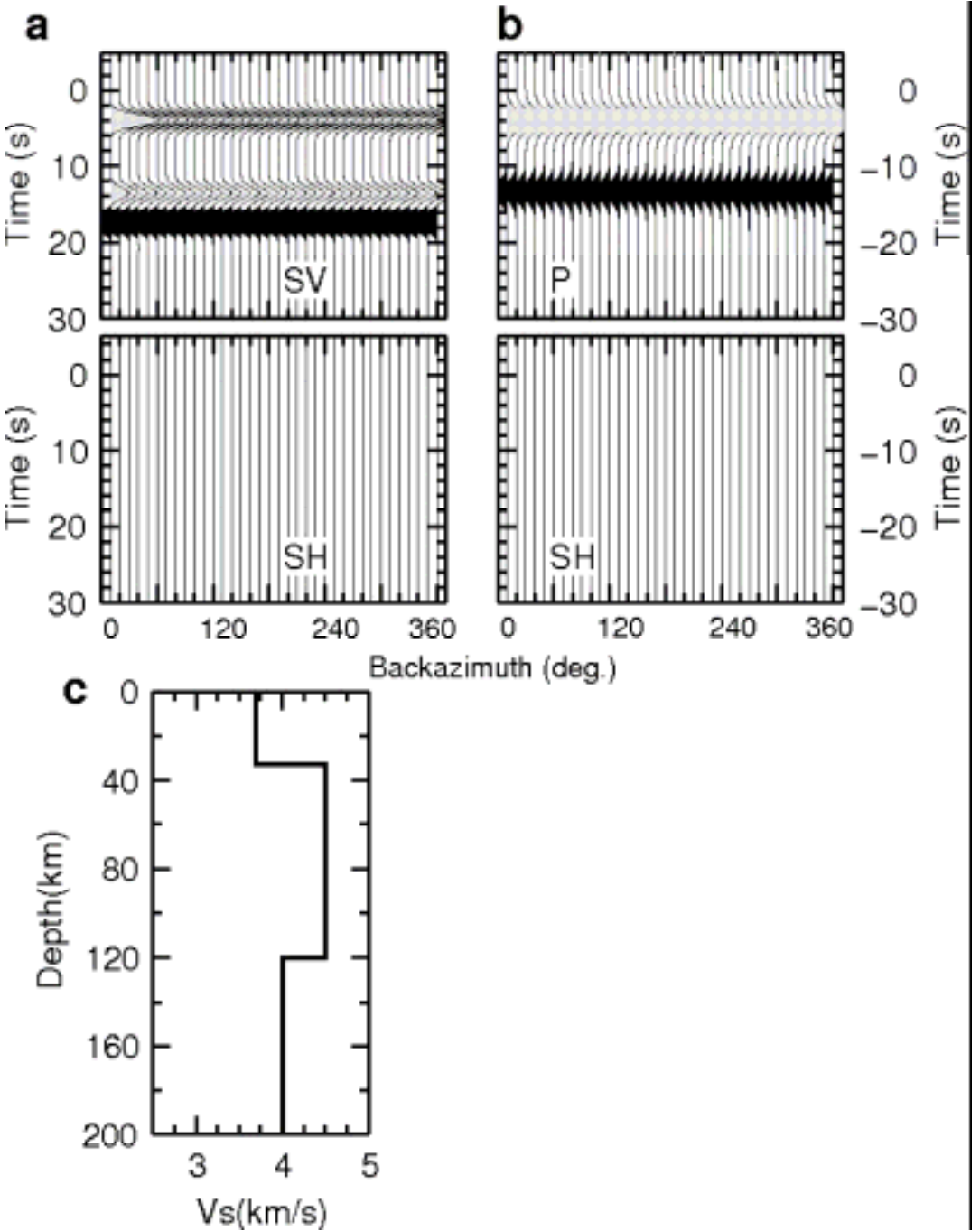
Slowness and backazimuth

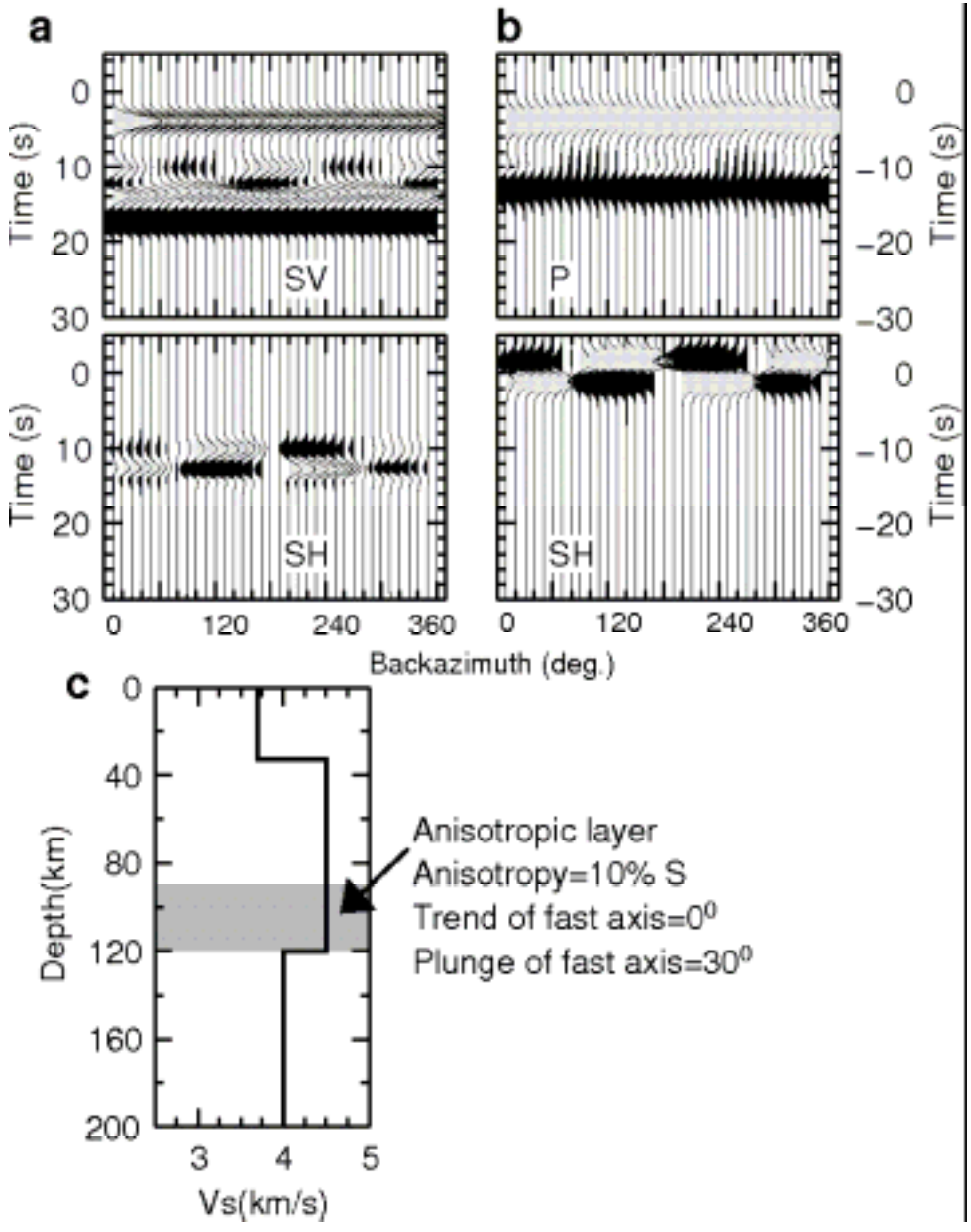
Fast propagation on surface = small slowness

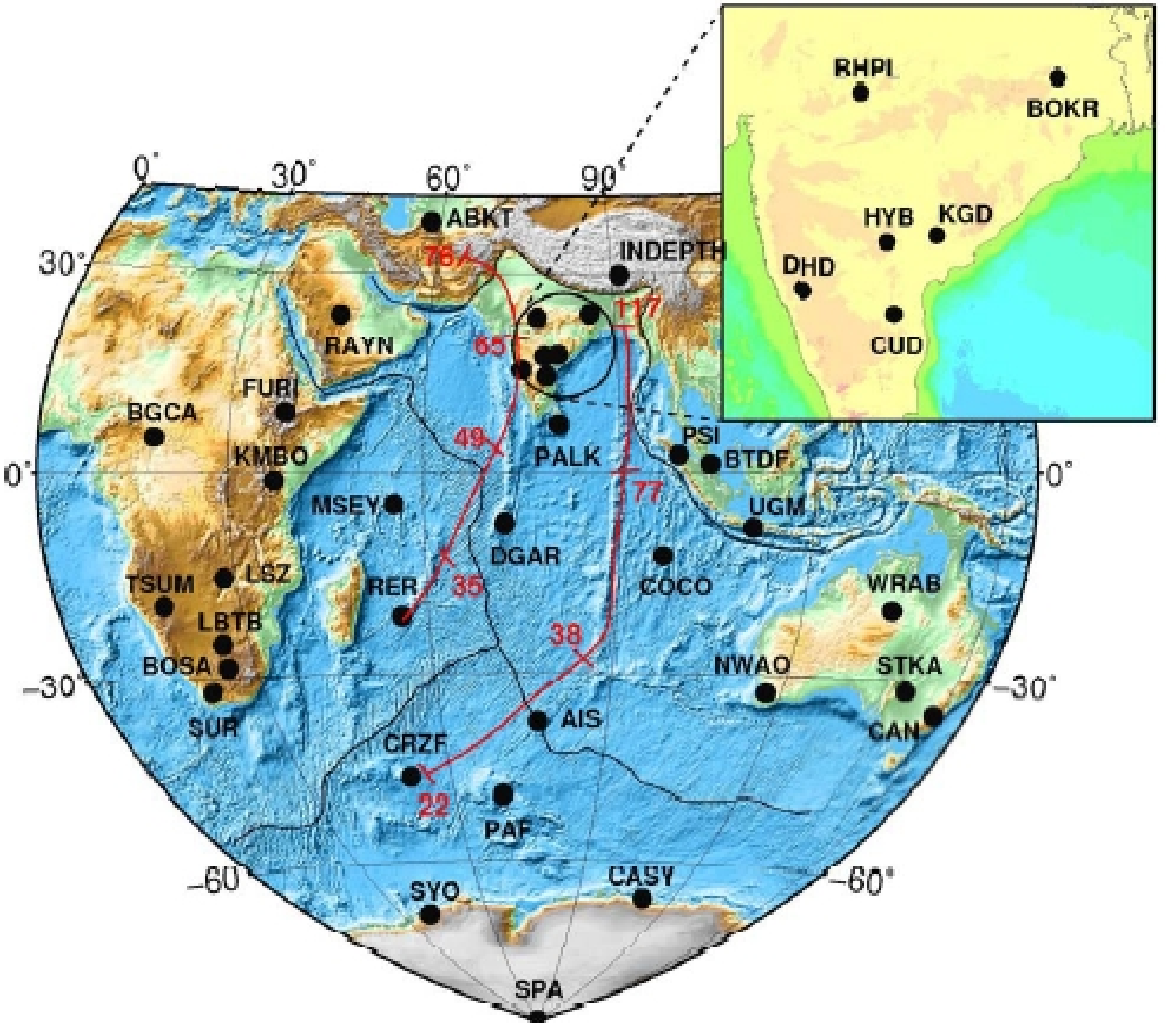


Slow propagation on surface = large slowness
The direction is backazimuth




a
b
c
Time (s)
0
10
20
30
SV
P
SH
SH
0
120
240
360
Backazimuth (deg.)
−10
−20
−30
Depth(km)
40
80
120
160
200
3
4
5
Vs(km/s)


a
b
Time (s)
0
10
20
30
SV
P
SH
SH
0
120
240
360
−10
−20
−30
Backazimuth (deg.)
c
Depth(km)
40
80
120
160
200
3
4
5
Vs(km/s)
Anisotropic layer
Anisotropy=10% S
Trend of fast axis=0⁰
Plunge of fast axis=30⁰


RHPI
BOKR
HYB
KGD
DHD
CUD
0°
30°
60°
90°
ABKT
INDEPTH
78
117
65
RAYN
FURI
BGCA
KMBO
49
PALK
PSI
BTDF
77
MSEY
UGM
DGAR
TSUM
LSZ
RER
35
COCO
WRAB
LBTB
38
BOSA
NWAO
STKA
SUR
AIS
CAN
CRZF
22
PAF
CASY
SYO
SPA
0°
30°
−30°
−60°

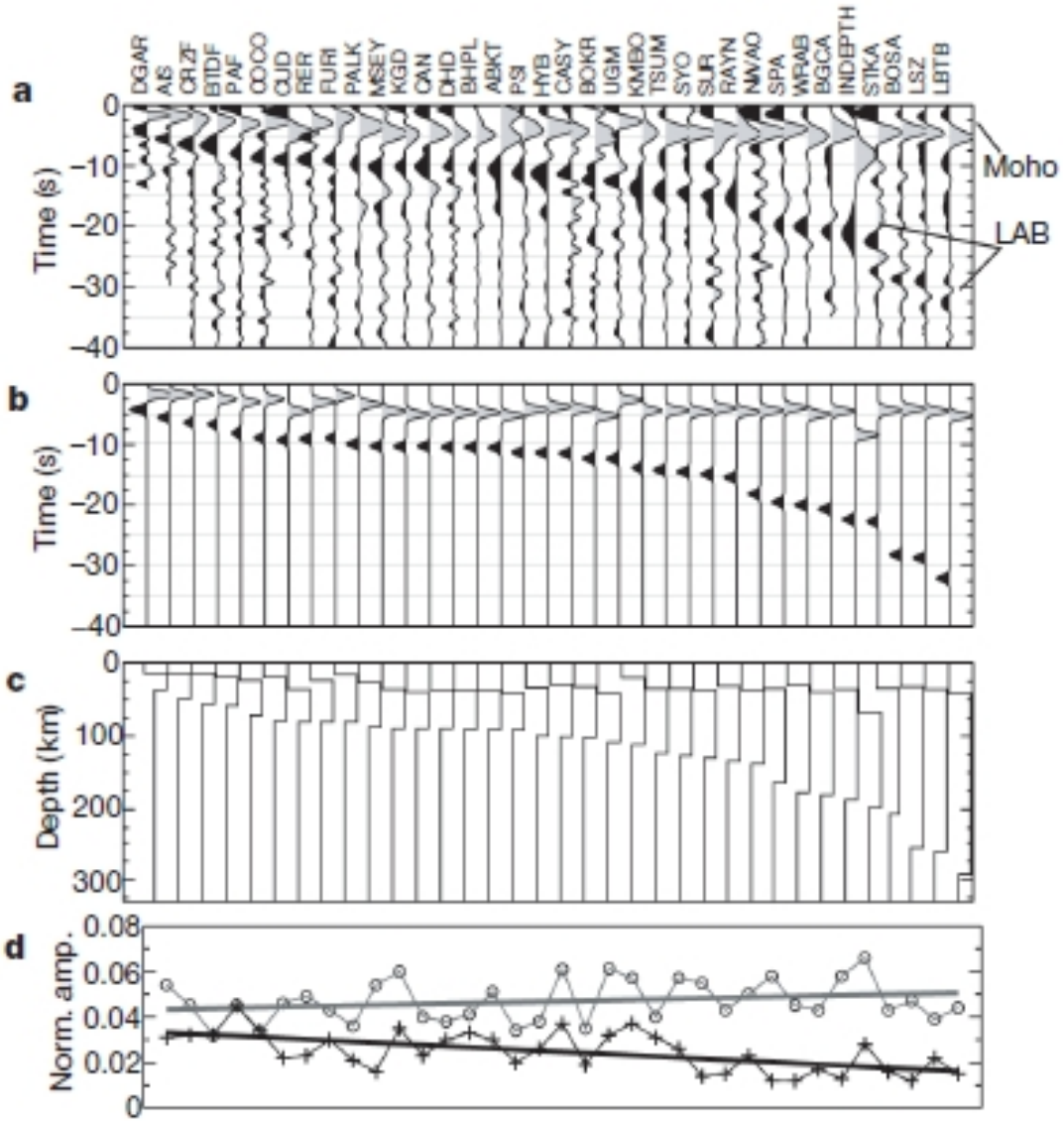


Figure 2 | S-receiver function data and modelling. **a**, Stacked S-receiver function traces from all stations used. Converted signals from the Moho and the LAB are clearly visible. The traces are arranged with increasing LAB time from left to right. The vertical axis measures the time differences between the

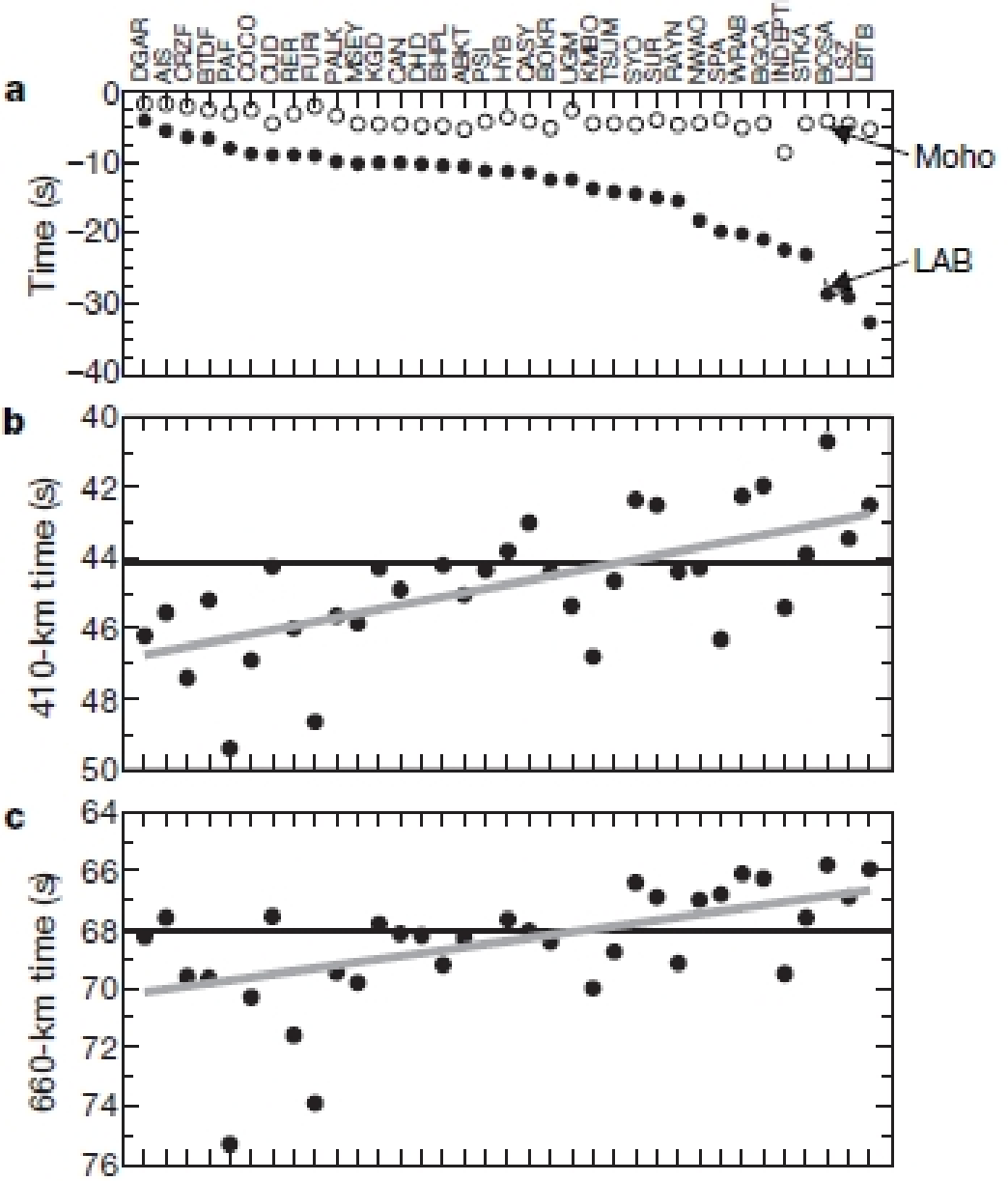


Figure 3 | Comparison of different upper mantle seismic phases. a, Filled circles show times for the S-to-P conversions at the LAB arranged in

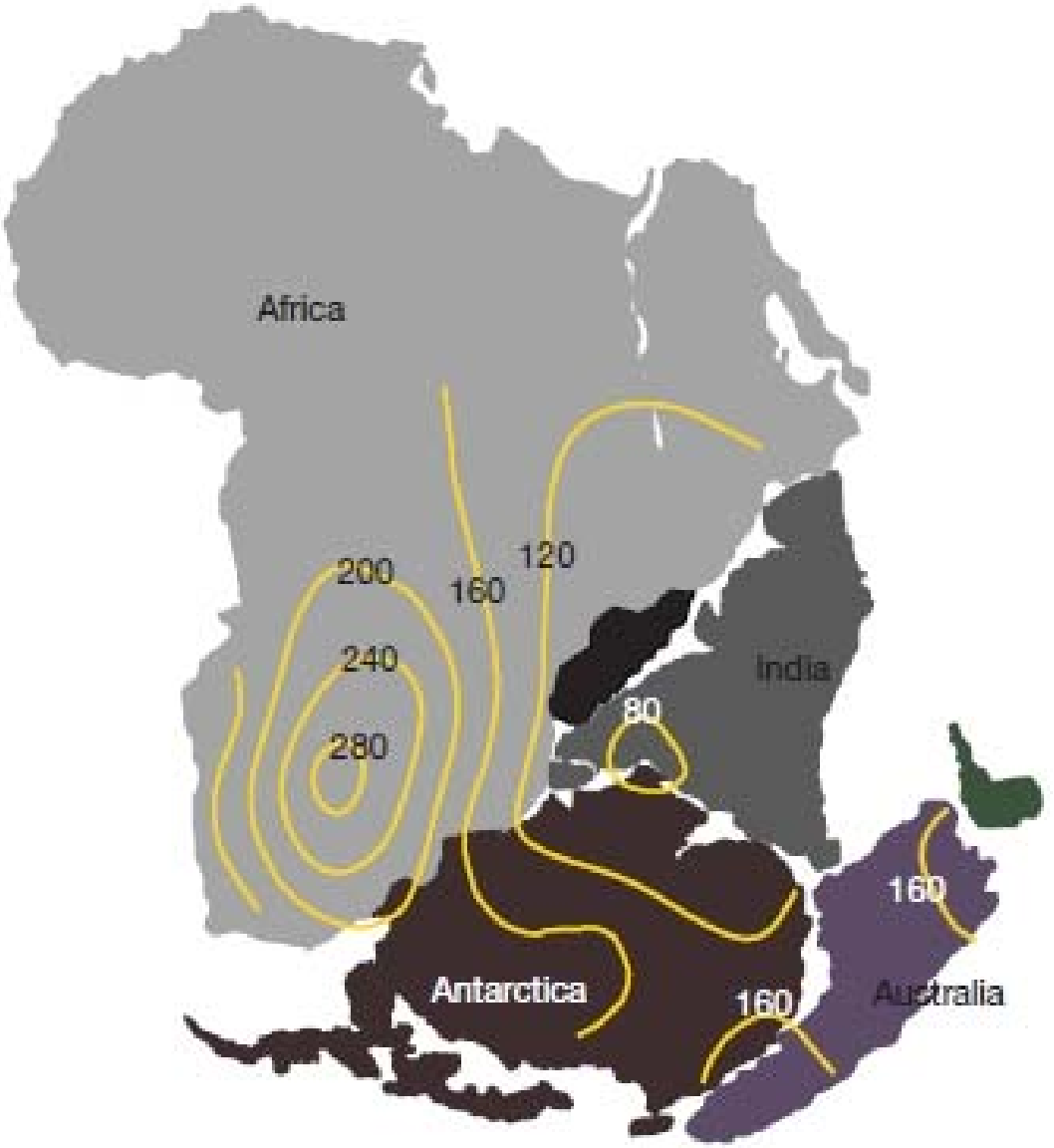
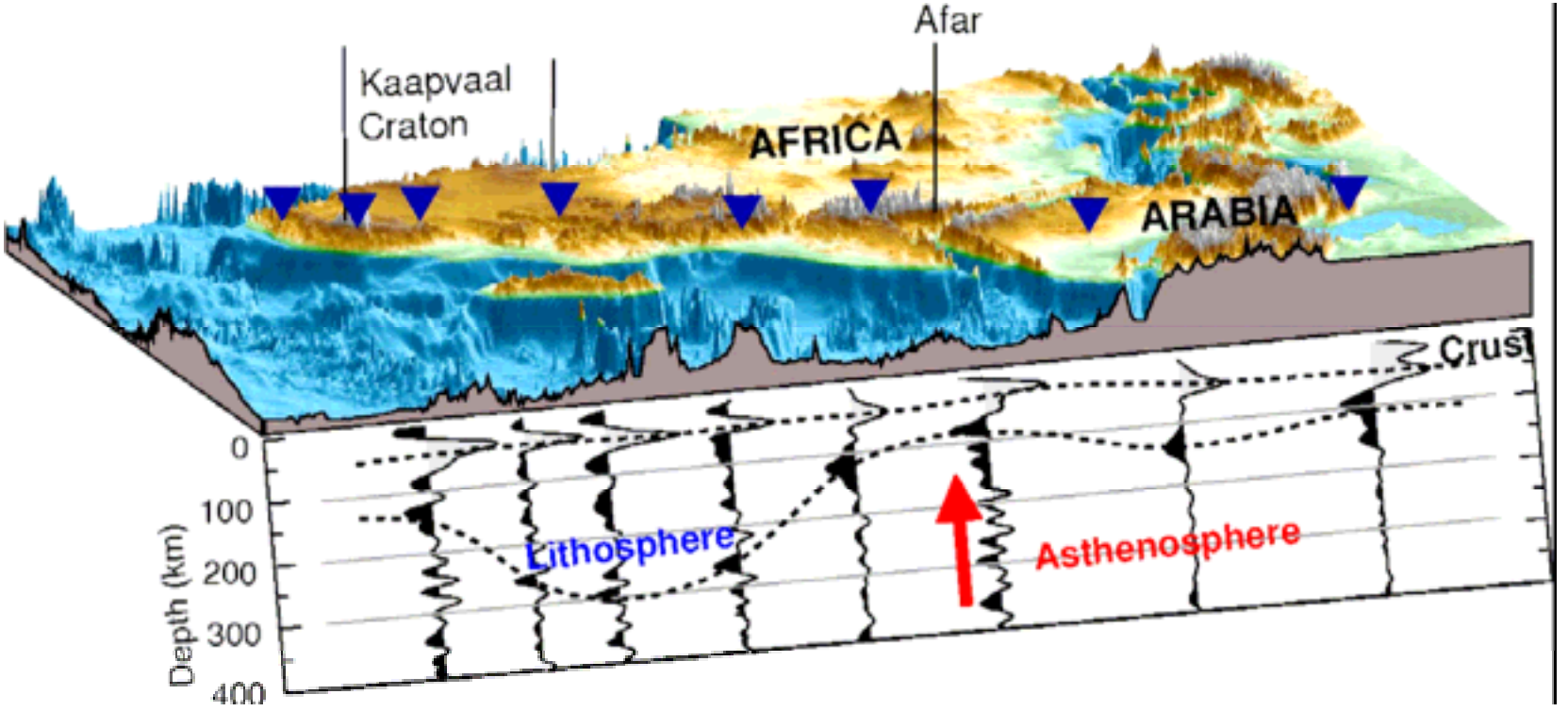
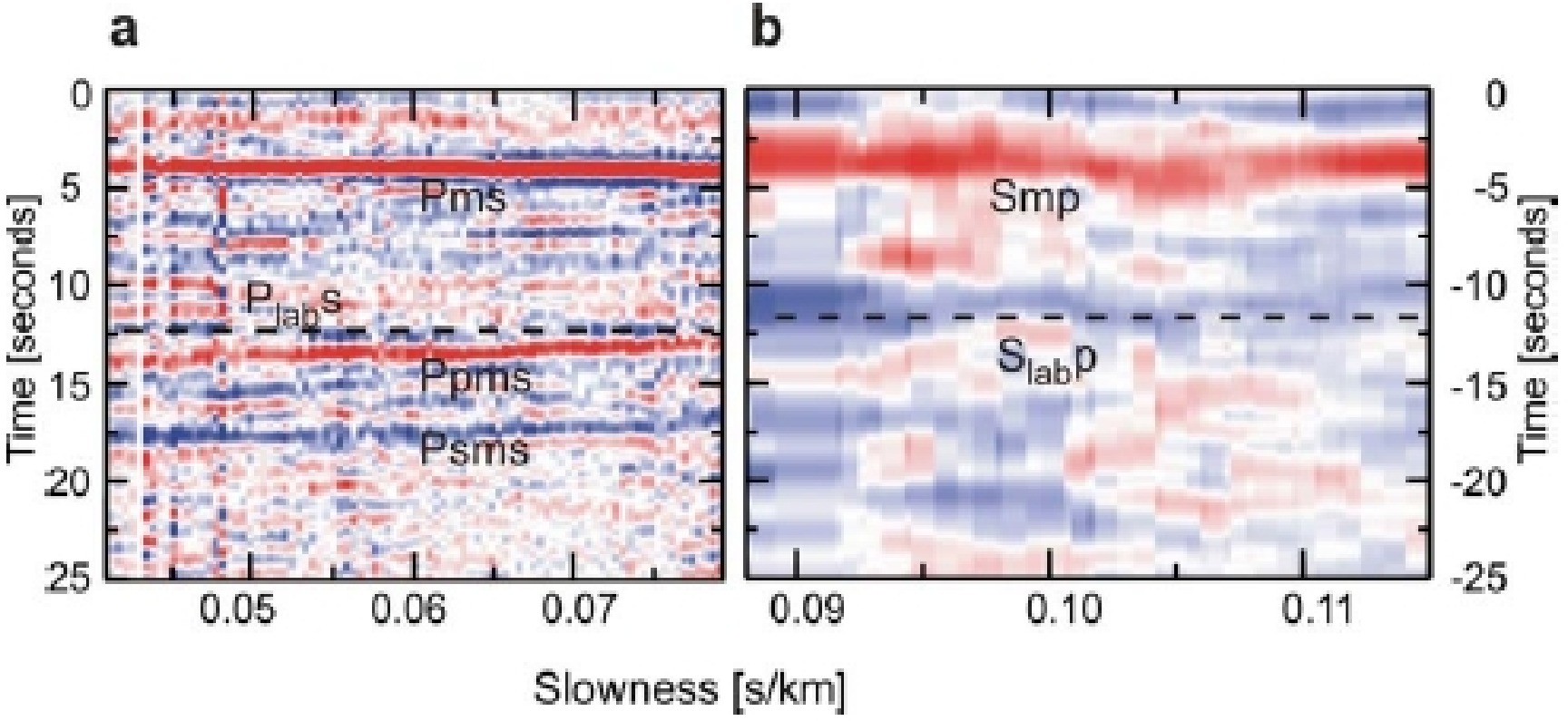
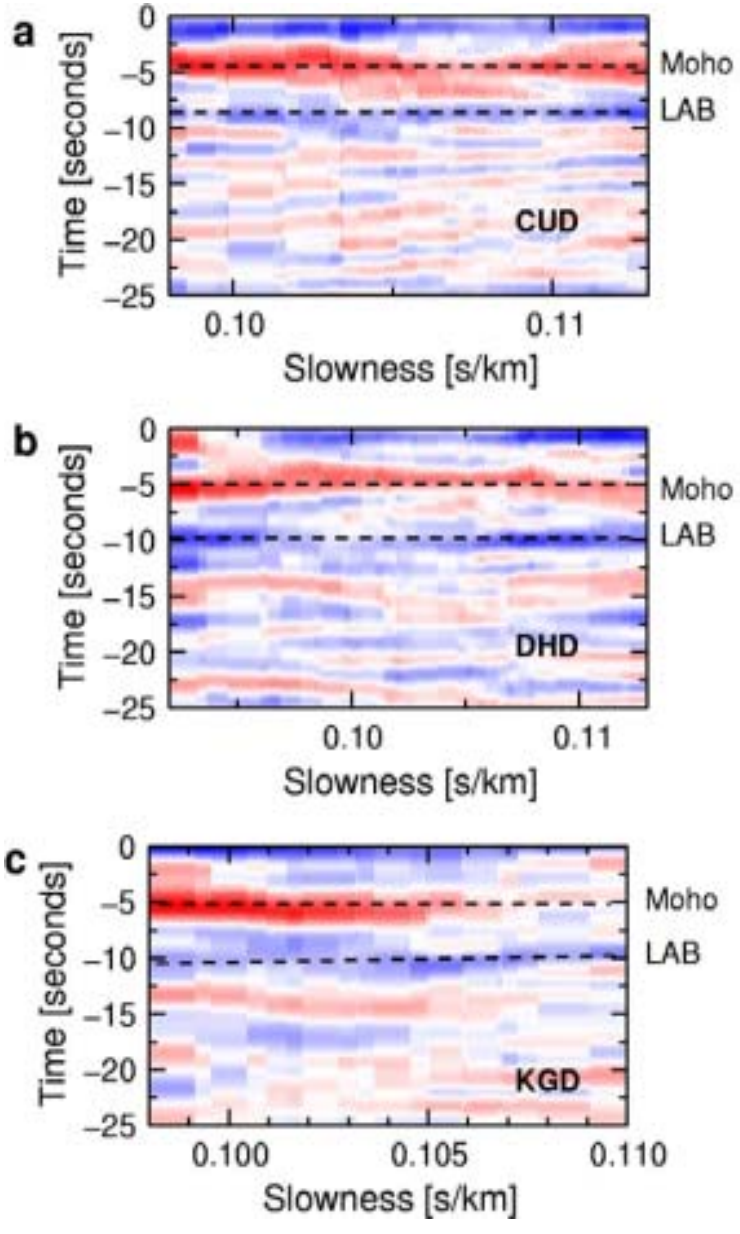


Figure 4 | Reconstruction of Permian Gondwanaland. The contours show the present-day continental lithospheric thicknesses.


Afar
Kaapvaal
Craton
AFRICA
ARABIA
Crust
0
100
200
300
400
Depth (km)
Lithosphere
Asthenosphere


a
b
Pms
$P_{lab}s$
Ppms
Psms
Smp
$S_{lab}p$
Time [seconds]
Time [seconds]
Slowness [s/km]
0
5
10
15
20
25
-5
-10
-15
-20
-25
0.05
0.06
0.07
0.09
0.10
0.11


a
Time [seconds]
0
−5
−10
−15
−20
−25
Moho
LAB
CUD
0.10
0.11
Slowness [s/km]
b
Time [seconds]
0
−5
−10
−15
−20
−25
Moho
LAB
DHD
0.10
0.11
Slowness [s/km]
c
Time [seconds]
0
−5
−10
−15
−20
−25
Moho
LAB
KGD
0.100
0.105
0.110
Slowness [s/km]

DGAR
AIS
CRZF
BTDF
PAF
COCO
CUD
RER
FURI
PALK
MSEY
KGD
CAN
DHD
BHPL
ABKT
PSI
HYB
CASY
BOKR
UGM
KMBO
TSUM
SYO
SUR
RAYN
NWAO
SPA
WRAB
BGCA
INDEPTH
STKA
BOSA
LSZ
LBTB
-20
-10
0
10
20
30
40
Time (s)
410
660