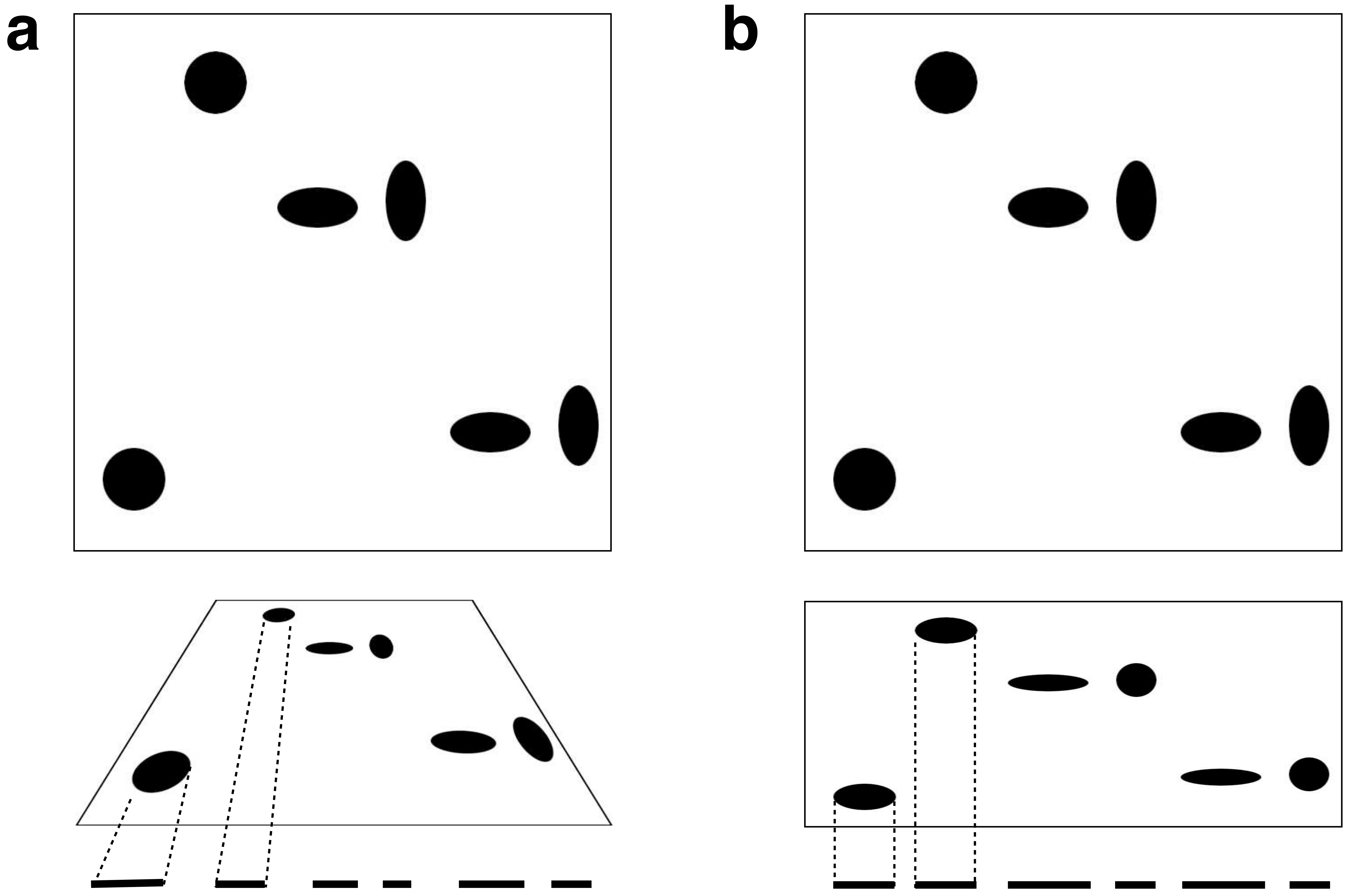


Figure 14.1
Seeing two-dimensional objects in flatland.
(a) With a central perspective;
(b) under parallel projection.

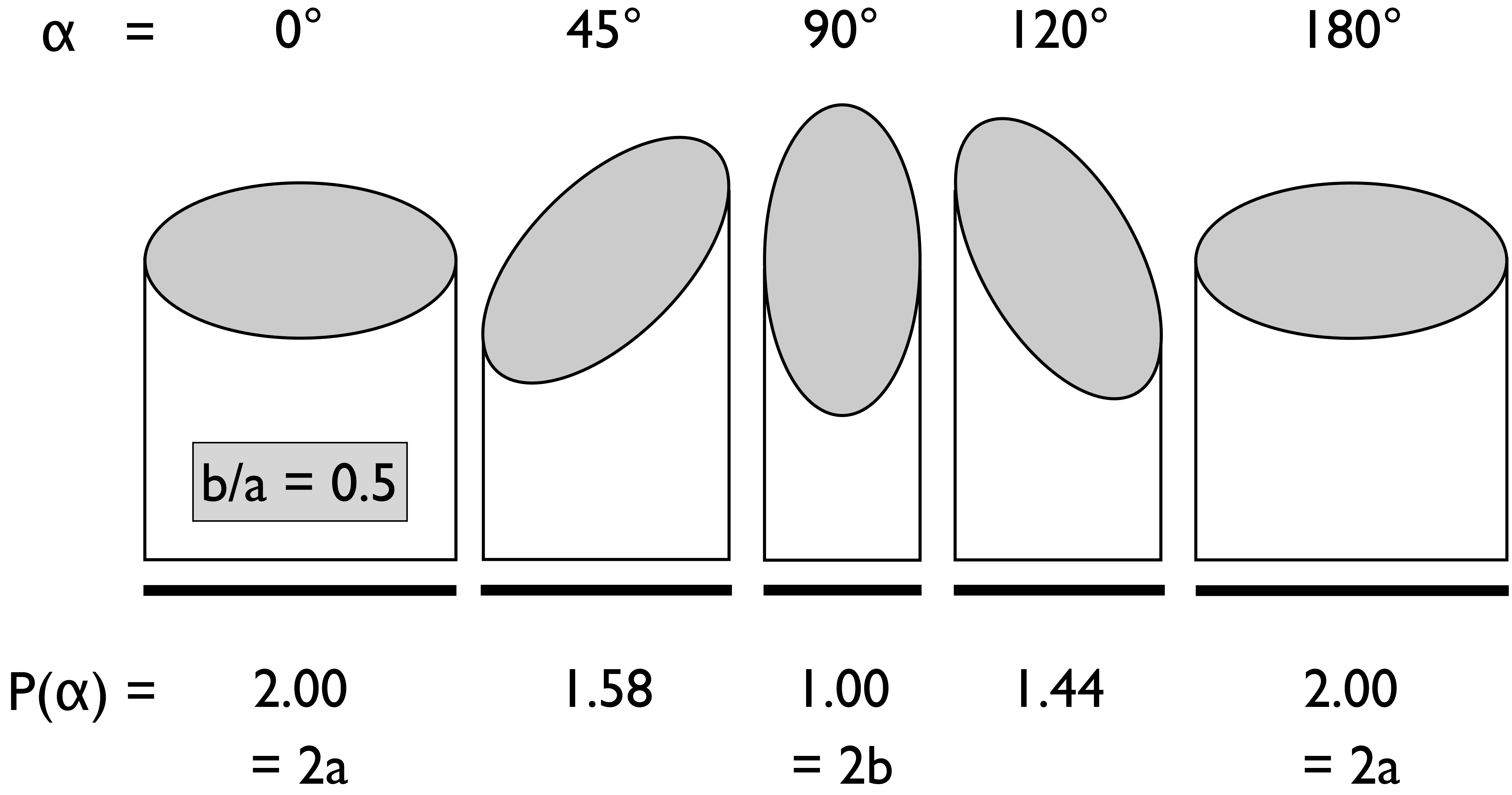


Figure 14.2
Projections of a single ellipse.
The length of projection, P, depends on the orientation, α, of the ellipse with respect to the x-axis and the length of the short and long axes, b and a. Here, the axial ratio, b/a, is 0.5.

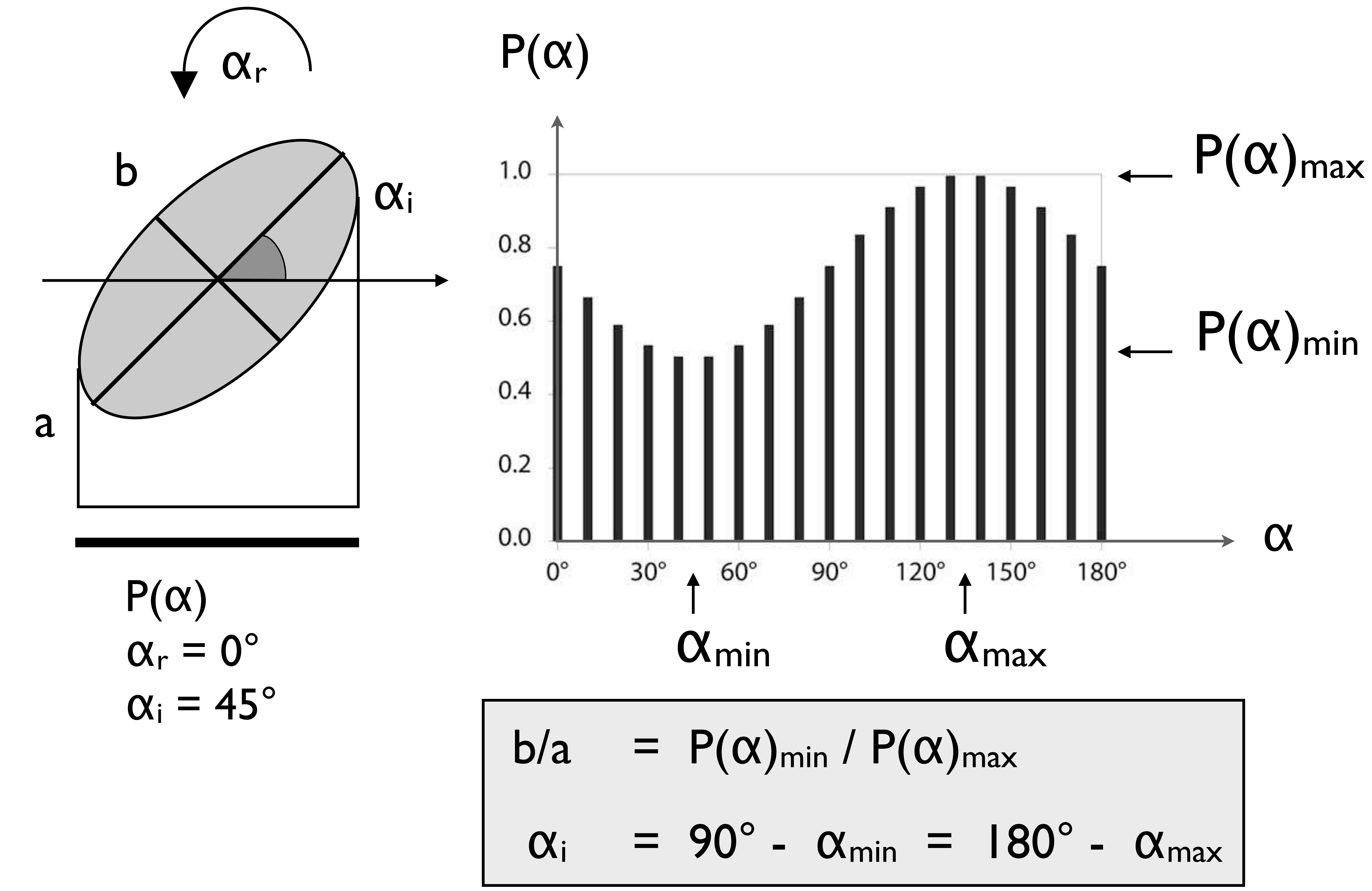


Figure 14.3
Projection curve, $P(\alpha)$, of a rotating ellipse.
The length of projection, P, depends on the initial orientation, α_i, of the ellipse and changes as a function of rotation, α_r, ($0° \leq \alpha_r \leq 180°$). The shortest and the longest projections, $P(\alpha)_{min}$ and $P(\alpha)_{max}$, occur at angles α_{min} and α_{max}, respectively, when either the shortest or the longest axis, b or a, is parallel to the x-axis. Here, the axial ratio, b/a, is 0.5.

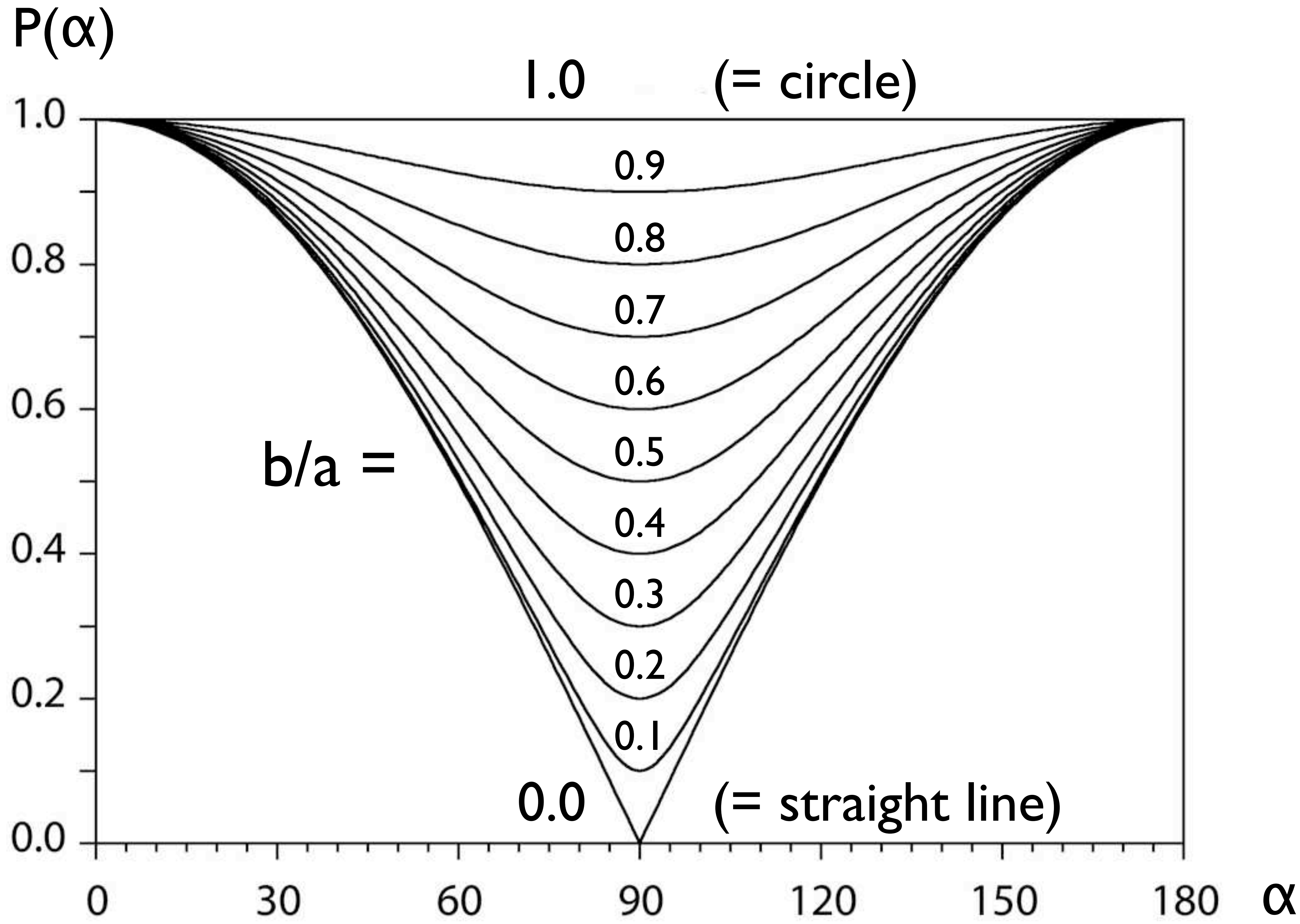


Figure 14.4
Projection curves of rotating ellipses with different axial ratios.
The ellipses are initially parallel to the x-axis, i.e., the initial orientation, α, = 0° and the long diameter, 2a, is 1.00. The projection curves, $P(\alpha)$, are shown for different axial ratios b/a of the ellipses: if b/a = 0, the ellipse is a line, if b/a = 1.00, the ellipse is a circle.

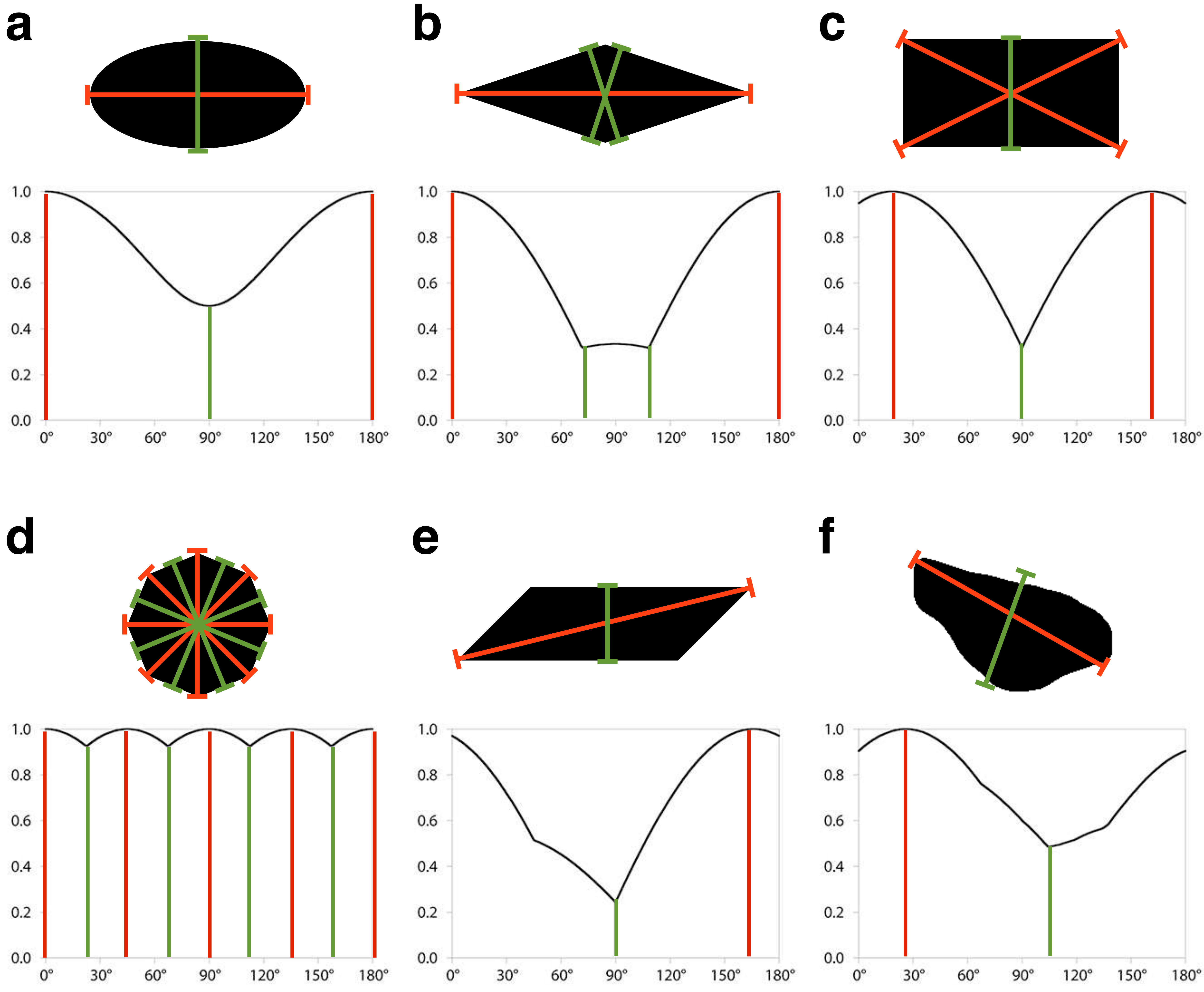


Figure 14.5
Projection functions of elliptical and non-elliptical shapes.
Longest projections in red - shortest projections in green.
(a) Ellipse: one minimum, one maximum, minimum and maximum are 90° apart
(b) rhomb: two minima, one maximum
(c) rectangle: one minimum, two maxima
(d) octagon: four minima, four maxima
(e) oblique quadrangle: one minimum, one maximum, minimum and maximum are not 90° apart
(f) 'natural' shape: one minimum, one maximum, minimum and maximum are not 90° apart.

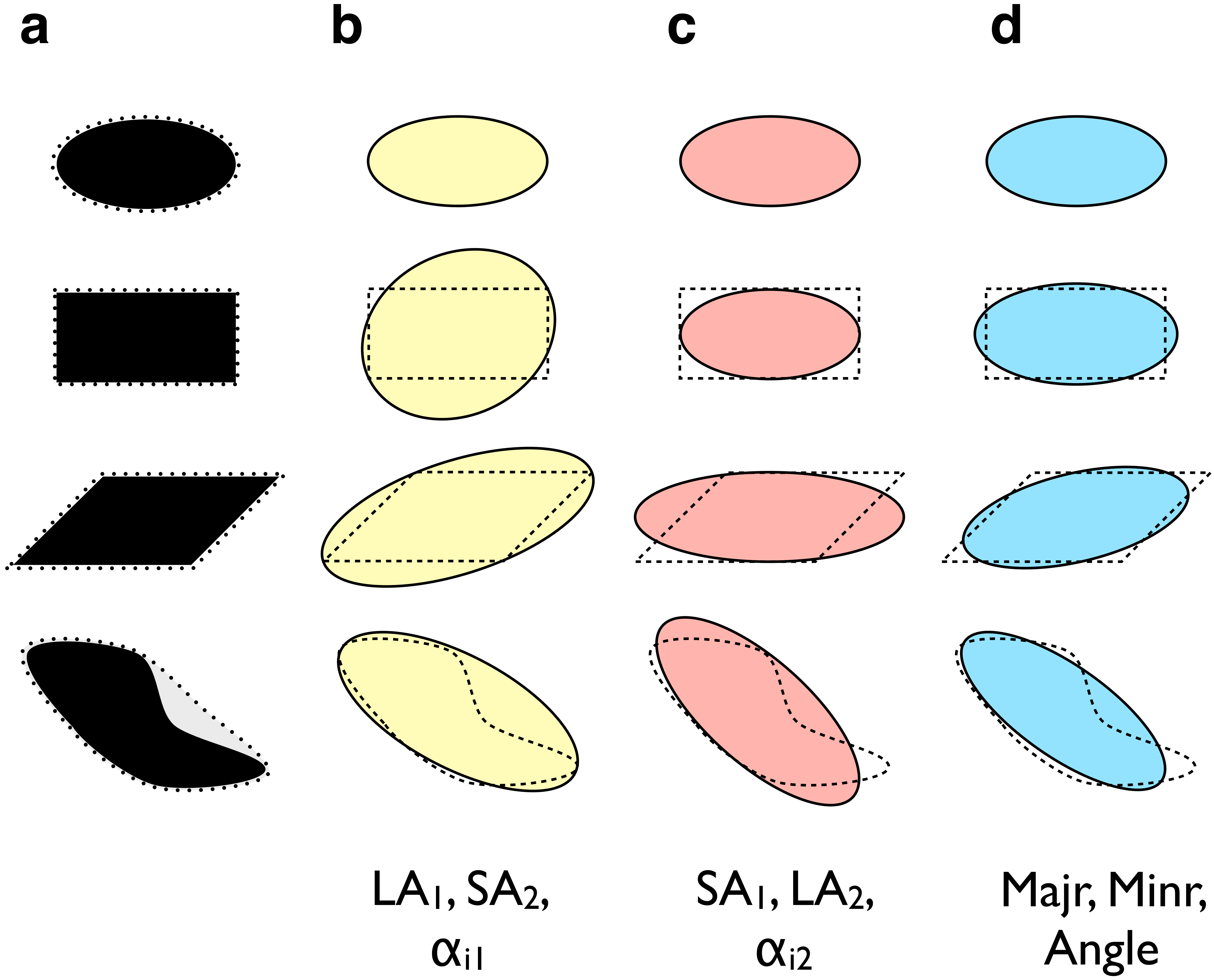


Figure 14.6
Long and short axes of elongate shapes.
(a) Original shapes with convex hull (stippled);
(b - d) best-fit ellipses with original outlines shown as dashed lines;
(b) the long axis, LA_1, is defined as the longest projection, the short axis, SA_2, as the projection normal to the longest;
(c) the short axis, SA_1, is defined as the shortest projection, the long axis, LA_2, as the projection normal to it;
(b, c) the angles, α_{i1} and α_{i2}, are the orientation of the long axes, LA_1 and LA_2, respectively, counterclockwise from positive x-axis;
(d) the axes and orientation of the best-fit ellipse are calculated using Image SXM Analyze.

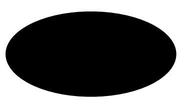
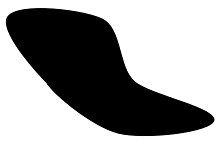
	L - ellipse		S - ellipse		SXM - ellipse	
	$a = LA_1$ $b = SA_2$ α_{i1} = orientation of LA_1		$b = SA_1$ $a = LA_2$ α_{i2} = orientation of LA_2		a = Majr b = Minr α = Angle	
shape	b/a	α_{i1} (°)	b/a	α_{i2} (°)	b/a	α (°)
1 	0.50	0	0.50	0	0.50	0
2 	0.80	153	0.50	0	0.50	0
3 	0.40	162	0.33	0	0.38	167
4 	0.42	28	0.40	42	0.38	35

Table 14.1
Best-fit ellipses.
For definition of LA_1, LA_2, SA_1, SA_2, α_{i1}, α_{i2}, see Figure 14.6; for definition of Majr, Minr and Angle, see Figure 8.2. Shapes are the same as in Figure 14.6; b/a = axial ratio; b = short axis; a = long axis; α_{i1}, α_{i2}, α = orientation of long axis, angles CCW from positive x-axis.

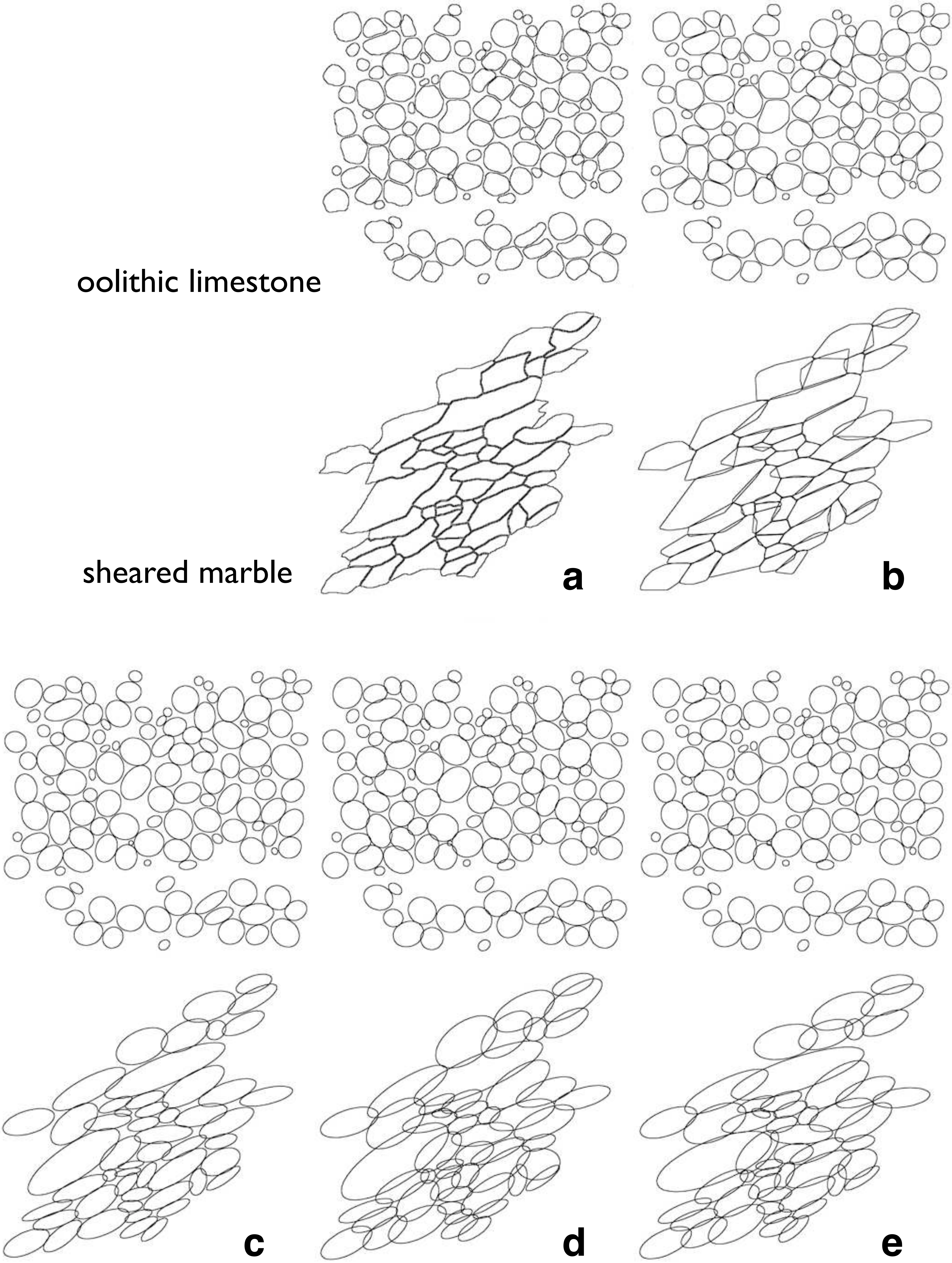

oolithic limestone
sheared marble
a
b
c
d
e

Figure 14.7

Outlines, convex hulls and best-fit ellipse approximations.

(a) Original fabric; top: particle in matrix = oolithic limestone (Hauptrogenstein, Jura Mountains Switzerland); bottom: crystalline aggregate = experimentally sheared Carrara marble (600°C, γ = 1.22, twinning regime, dextral shear sense);

(b) convex hull of the particles;

(c) the axes and orientations of the best-fit ellipses are calculated using Image SXM Analyze.

(d) the long axes of the best-fit ellipses, LA_1, are defined as the longest, the short axes, SA_2, as the projections normal to the longest, the angles, α_{i1} are the orientations of the long axes, LA_1;

(e) the short axes of the best-fit ellipses, SA_1, are defined as the longest, the long axes, LA_2, as the projections normal to the shortest, the angles, α_{i2} are the orientations of the long axes, LA_2.

For better comparison with (c), the ellipses in (d) and (e) are also scaled to the size of the particles.

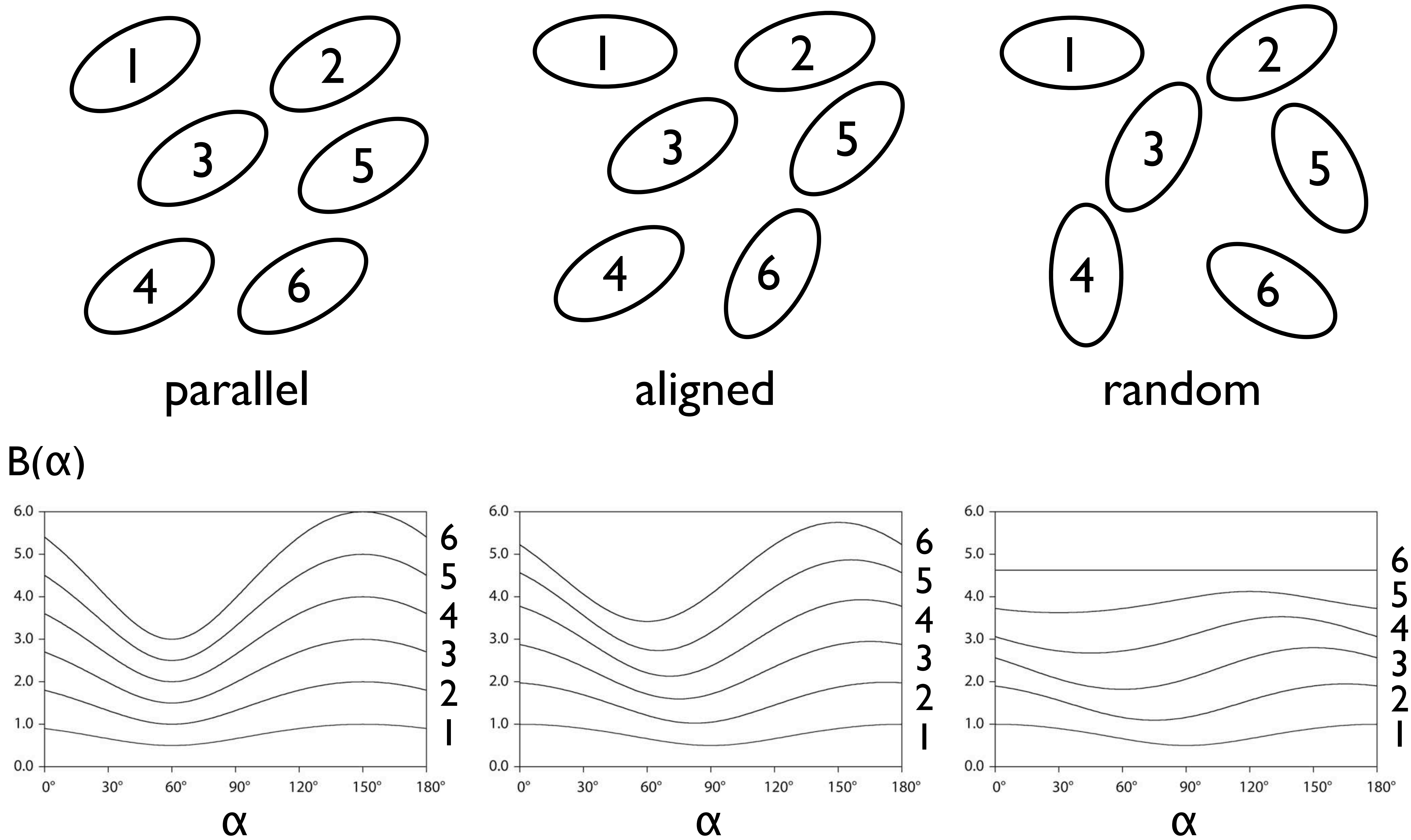


Figure 14.8
Projection curves, B(α), of sets of ellipses.
The projection curves of the individual ellipses (labeled 1 to 6) are shown as cumulative plots.
(a) Parallel ellipses: orientation distribution function (ODF) = delta function: $h(\alpha_i) = \infty$ if $\alpha_i = 30°$; fabric as a whole has same anisotropy as individual ellipses
(b) ellipses with preferred orientation: ODF = normal distribution: $h(\alpha_i) = 30° \pm 10°$; fabric as a whole is less anisotropic than individual ellipses
(c) randomly oriented ellipses: ODF = uniform distribution; fabric as a whole is isotropic.

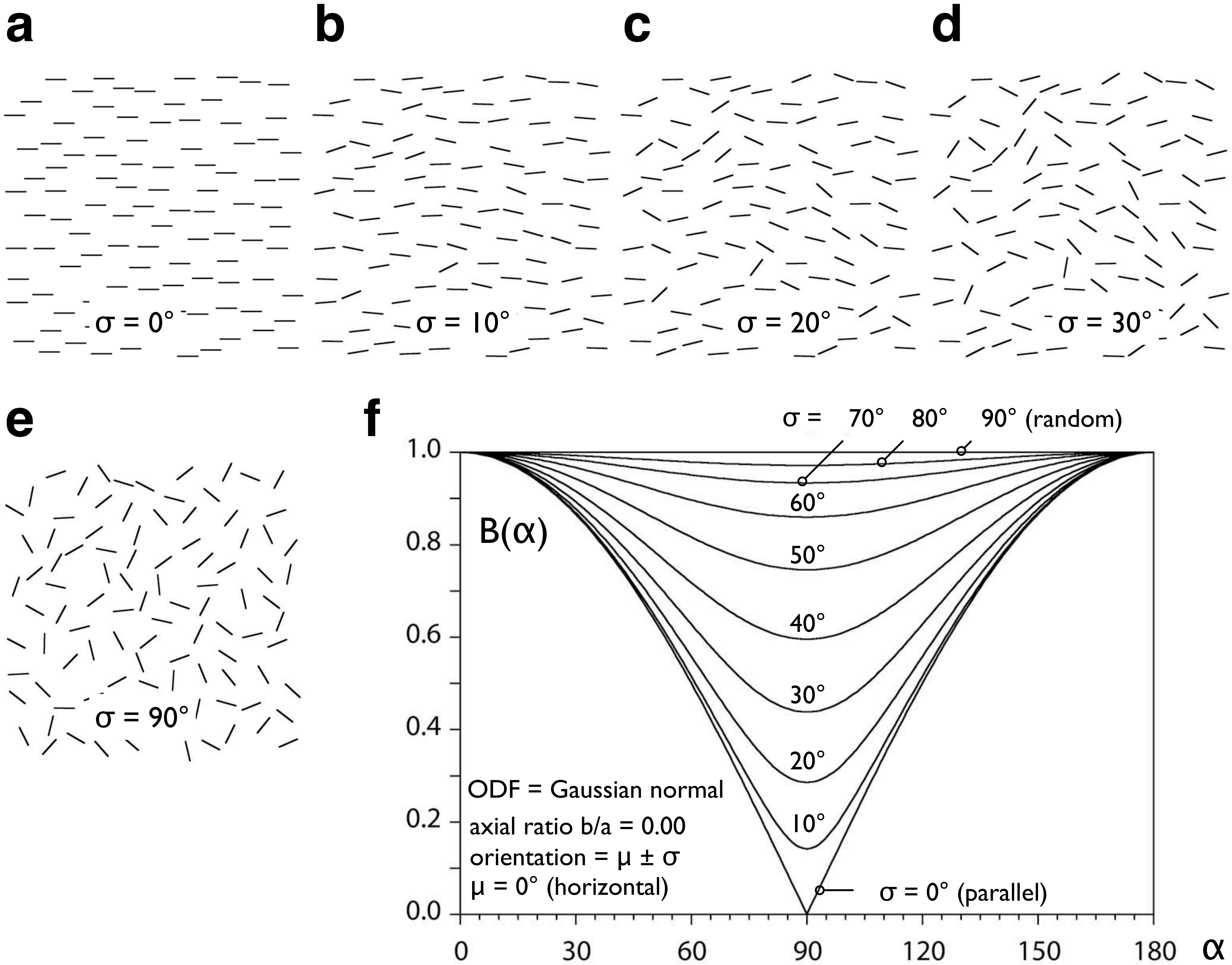


Figure 14.9
Line fabrics and projection curves $B(\alpha)$.
Orientation of lines is described in terms of normal distributions with mean orientation, $\mu = 0°$ and different standard deviations.
(a) Perfectly parallel lines: $h(\alpha_i) = 1.00$; or normal distribution with $\mu = 0°$; $\sigma = 0°$;
(b - d) preferred orientation of lines: $h(\alpha_i)$ = normal distribution with $\mu = 0°$; $\sigma = 10°$, $20°$ and $30°$;
(e) random orientation of lines: $h(\alpha_i) = 1.00$; or normal distribution with $\mu = 0°$; $\sigma = 90°$;
(f) projection curve $B(\alpha)$ of sets of 100 lines; $B(\alpha)$ is normalized such that $B(\alpha)_{max} = 1.00$.

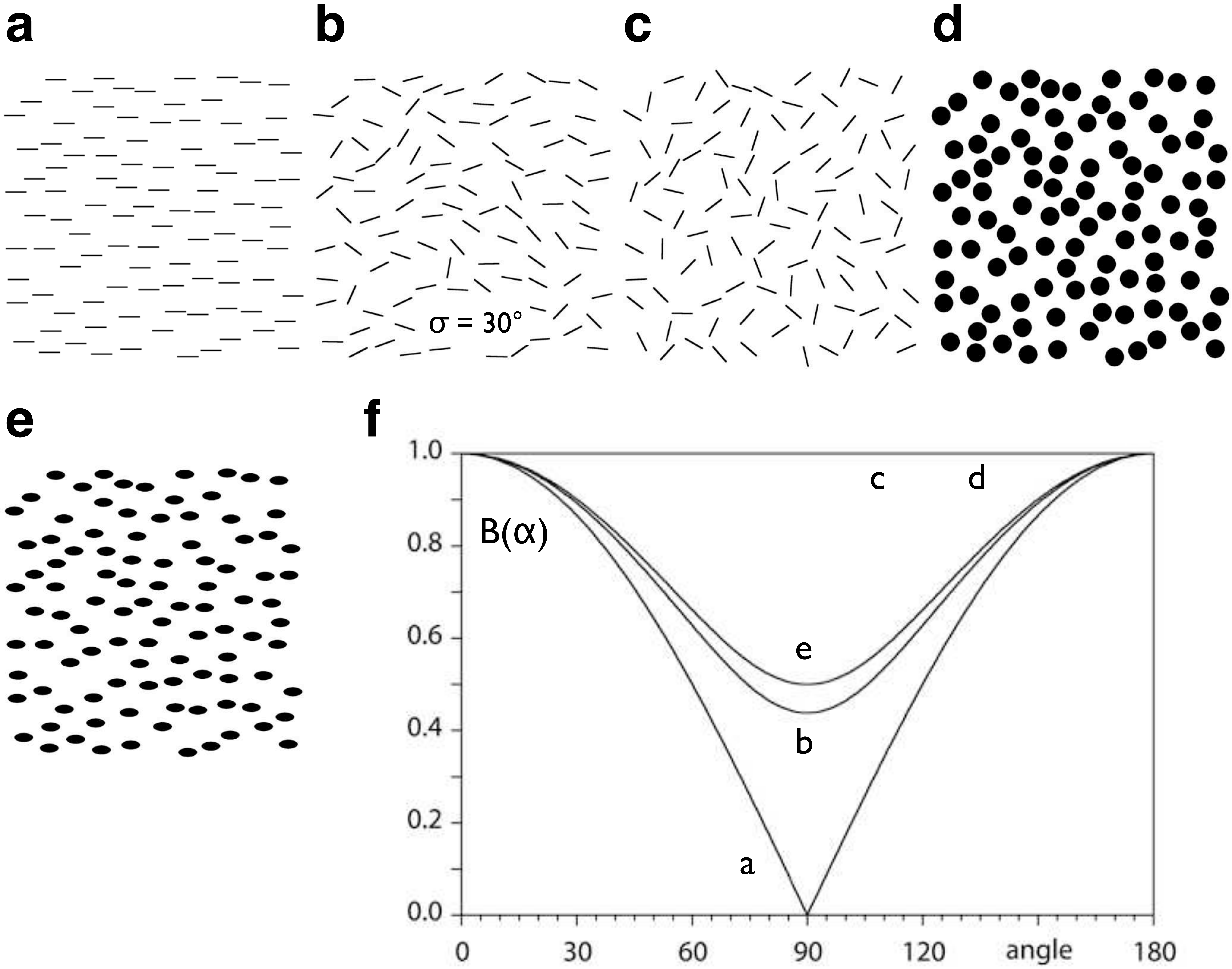
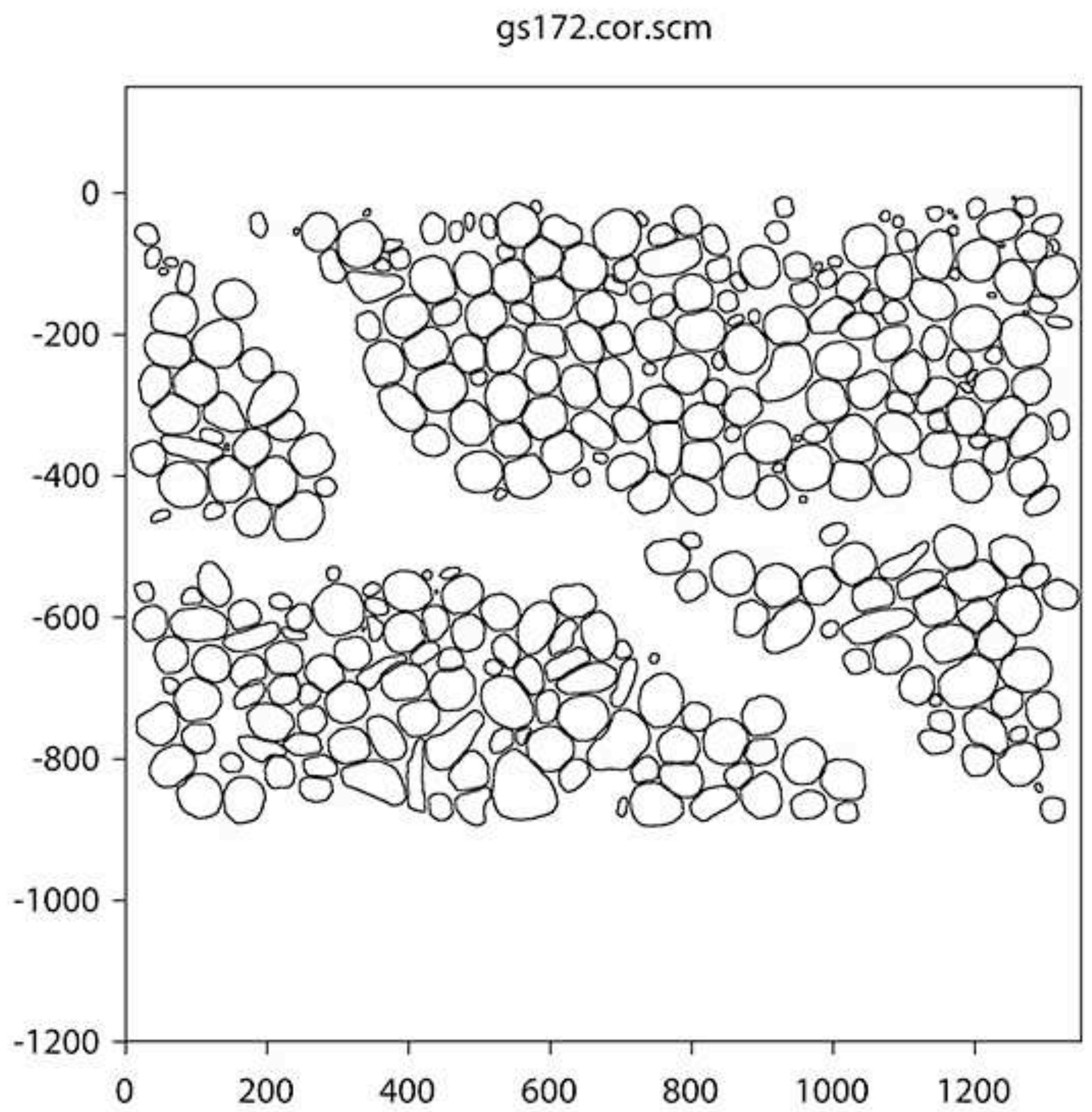


Figure 14.10
Effect of increasingly random orientation and increasing axial ratio on bulk fabric.
(a) Perfectly parallel lines: b/a = 0.00; $h(\alpha_i)$ = delta function;
(b) preferred orientation of lines: b/a = 0.00; $h(\alpha_i)$ = normal distribution;
(c) random orientation of lines: b/a = 0.00; $h(\alpha_i)$ = uniform distribution;
(d) circles: b/a = 1.0;
(e) perfectly parallel ellipses: b/a = 0.5; $h(\alpha_i)$ = delta function;
(f) projection curves of fabrics (a - e); $B(\alpha)$ is normalized such that $B(\alpha)_{max}$ = 1.00.

```
gs172 x-y coordinates  smoothed
      16662
   927.24701      -5.5961385
   928.28491      -5.6106129
   933.92932      -6.1165819
   936.13708      -6.8479538
   938.95685      -8.0975637
   939.92847      -8.9699326

 .... etc.

   926.55768      -5.8526130
   927.24701      -5.5961385
   9999.0000       9999.0000

   .... etc.

   1009.1608      -863.35156
   1010.9039      -862.68860
   1013.5924      -861.67352
   1014.4003      -861.39825
   9999.0000       9999.0000
```



Software Box 14.1
Input file gs172.cor.scm with x-y coordinates of particle outlines; plot of file.

```
-------------------------------------------------------------
 ***  paror  ***                            2010-11-24, rh
 ------------------------------------------------------------
 analysis of bulk particle fabric
 maximum number of points per particles is 1000
 maximum number of particles is 5000
 ------------------------------------------------------------
 input file:
    line 1:             bti(132byte) title (must have)
    line 2:             n            total number of points
    for each particle: x,y          floating x-y coordinates
    |                   ...          ...etc.
    |                   Xend,Yend    end coordinates
 ------------------------------------------------------------
 name of file >
1 gs172.cor.scm
end coordinate of input file (0, 9999, ... one number):
2 9999
 increment of rotation angle (minimum: 1 deg.) >
3 10
 do you want printout (0), file (1), both (2) ? >
4 1
5  name of output file ? [gs172.cor.p10] (return=default) >
6  name of file with B(alfa) curve ? [gs172.cor.j10] >
7  name of file with long-axes ODF ? [gs172.cor.x10] >
8  name of file with particle data ? [gs172.cor.d10] >
```

Software Box 14.2
Dialog with program PAROR; answers are numbered and highlighted, see text for explanation.

10°	5°	1°	file type
file.p10	file.p05	file.p01	screen output
file.d10	file.d05	file.d01	axes and orientations
file.j10	file.j05	file.j01	B(α) curve
file.x10	file.x05	file.x01	ODF of long axes

Table 14.2
Default file name extensions used for result files created by the PAROR program.
For angular resolutions of 10°, 5° and 1°.

```
paror analysis of gs172.cor.scm
--------------------------------------------------------------------

B(alfa)min =         44.762            B(alfa)max =        47.549
Alfamin =            75.               Alfamax =           14.
Bulk b/a =                  0.94138

Angular difference =      119.
(diff < 90 deg = dextral monoclinic)

Preferred orientation (of LA1) alfap1 =   166.
Preferred orientation (of LA2) alfap2 =    15.
```

1

```
--------------------------------------------------------------------
length of projections, B(alpha), (= Feret diam.)

 angle           mean      variance        st.dev.     skewness

    10        47.51385     384.32730      19.60427      -0.23660
    20        47.45034     376.00531      19.39086      -0.24753
    30        46.98285     361.55994      19.01473      -0.24991
    40        46.32403     351.31671      18.74344      -0.23435
    50        45.60604     341.57437      18.48173      -0.21703
    60        45.08461     335.89786      18.32752      -0.20634
    70        44.79977     335.37720      18.31331      -0.19058
    80        44.77297     338.23099      18.39106      -0.17372
    90        45.08445     350.80429      18.72977      -0.19561
   100        46.10207     362.16537      19.03064      -0.19748
   110        46.60590     367.72769      19.17623      -0.19149
   120        46.86028     366.88049      19.15413      -0.18453
   130        47.05245     369.35434      19.21859      -0.18661
   140        47.23512     372.40295      19.29774      -0.18645
   150        47.32745     376.34705      19.39967      -0.17898
   160        47.15906     379.88049      19.49052      -0.16303
   170        46.72064     378.98520      19.46754      -0.15489
   180        46.88687     387.06946      19.67408      -0.20411
```

2

```
--------------------------------------------------------------------
histogram: average length of projection versus angle of projection

   10  ::::::::::::::::::::::::************************************
   20  ::::::::::::::::::::::::***********************************
   30  ::::::::::::::::::::::::***********************************
   40  :::::::::::::::::::::::***********************************
   50  :::::::::::::::::::::::**********************************
   60  :::::::::::::::::::::::*********************************
   70  :::::::::::::::::::::::*********************************
   80  :::::::::::::::::::::::*********************************
   90  :::::::::::::::::::::::*********************************
  100  ::::::::::::::::::::::::**********************************
  110  ::::::::::::::::::::::::**********************************
  120  ::::::::::::::::::::::::***********************************
  130  ::::::::::::::::::::::::***********************************
  140  ::::::::::::::::::::::::***********************************
  150  ::::::::::::::::::::::::***********************************
  160  ::::::::::::::::::::::::***********************************
  170  ::::::::::::::::::::::::**********************************
  180  ::::::::::::::::::::::::***********************************
```

3

Software Box 14.3

PAROR output file gs172.cor.p10:

(1) Calculation of $B(\alpha)_{max}$, $B(\alpha)_{min}$, α_{max} and α_{min} using an evaluation at 1° increments, angular difference is between α_{max} and α_{min};
(2) Length of projection, $B(\alpha)$, list of values;
(3) Mean length of projection and standard deviation, shown as histogram;

```
evaluation of particle axes:
--------------------------------------------------------------------
 number of projected particles:   343
                             mean   variance    st.dev.   skewness

 longest projection       51.8276   430.4483    20.7472    -0.1907
 shortest projection      39.6860   279.0329    16.7043    -0.2845
 perp. to longest         41.4572   298.4258    17.2750    -0.3207
 perp. to shortest        50.6558   426.2610    20.6461    -0.1372

 perp.L/longest            0.8053     0.0207     0.1440    -1.1211
 shortest/longest          0.7680     0.0183     0.1352    -1.0944

 shortest/perp.S           0.7905     0.0212     0.1456    -1.0217
 perp.L/perp.S             0.8294     0.0249     0.1578    -0.9547
```

4

5

```
histogram of long axes and number of long axes LA1 versus angle of rotation

          average length of long axes:              number of long axes:

55.47  10 ***************************         6  10 ****
43.88  20 *********************              16  20 ***********
52.72  30 **************************         26  30 *******************
52.30  40 *************************          23  40 ****************
58.02  50 ****************************       18  50 *************
43.69  60 *********************              20  60 **************
53.99  70 **************************         28  70 ********************
57.62  80 ****************************       15  80 **********
60.43  90 ******************************     13  90 *********
43.48 100 *********************              13 100 *********
39.46 110 *******************                14 110 **********
41.96 120 ********************               11 120 ********
55.32 130 ***************************        14 130 **********
54.32 140 **************************         24 140 *****************
48.31 150 ***********************            21 150 ***************
51.23 160 *************************          41 160 ******************************
58.36 170 ****************************       32 170 ***********************
56.10 180 ***************************         8 180 *****
```

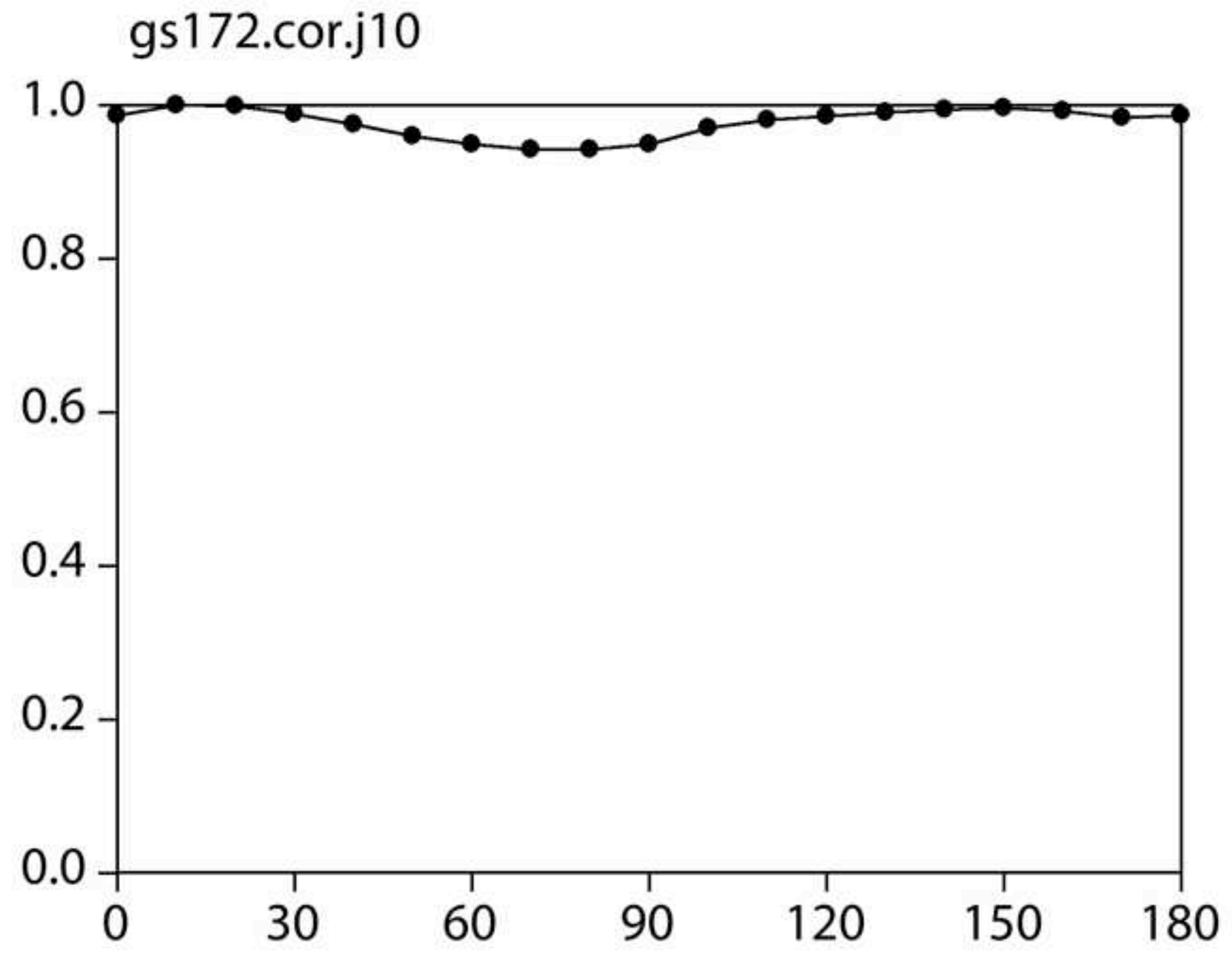
6

```
histogram of long axes and number of long axes LA2 versus angle of rotation

            average length of long axes:              number of long axes:

54.29  10 *************************          33  10 ***********************
49.71  20 ***********************            28  20 ********************
59.64  30 ****************************       27  30 *******************
53.75  40 *************************          27  40 *******************
56.98  50 ***************************        16  50 ***********
62.63  60 *****************************       8  60 *****
58.97  70 ****************************        8  70 *****
51.08  80 ************************            7  80 *****
34.83  90 ****************                   31  90 **********************
50.66 100 ************************           28 100 ********************
50.02 110 ***********************            16 110 ***********
43.84 120 ********************               10 120 *******
62.69 130 ******************************     11 130 *******
58.40 140 ***************************        10 140 *******
56.56 150 ***************************        13 150 *********
47.53 160 **********************             15 160 **********
56.79 170 ***************************        13 170 *********
40.26 180 *******************                42 180 ******************************
```

Software Box 14.3
PAROR output file gs172.cor.p10:

(4) Axes and axial ratios of particles;
(5) Length and number of long axes LA_1 versus orientation;
(6) Length and number of long axes LA_2 versus orientation.

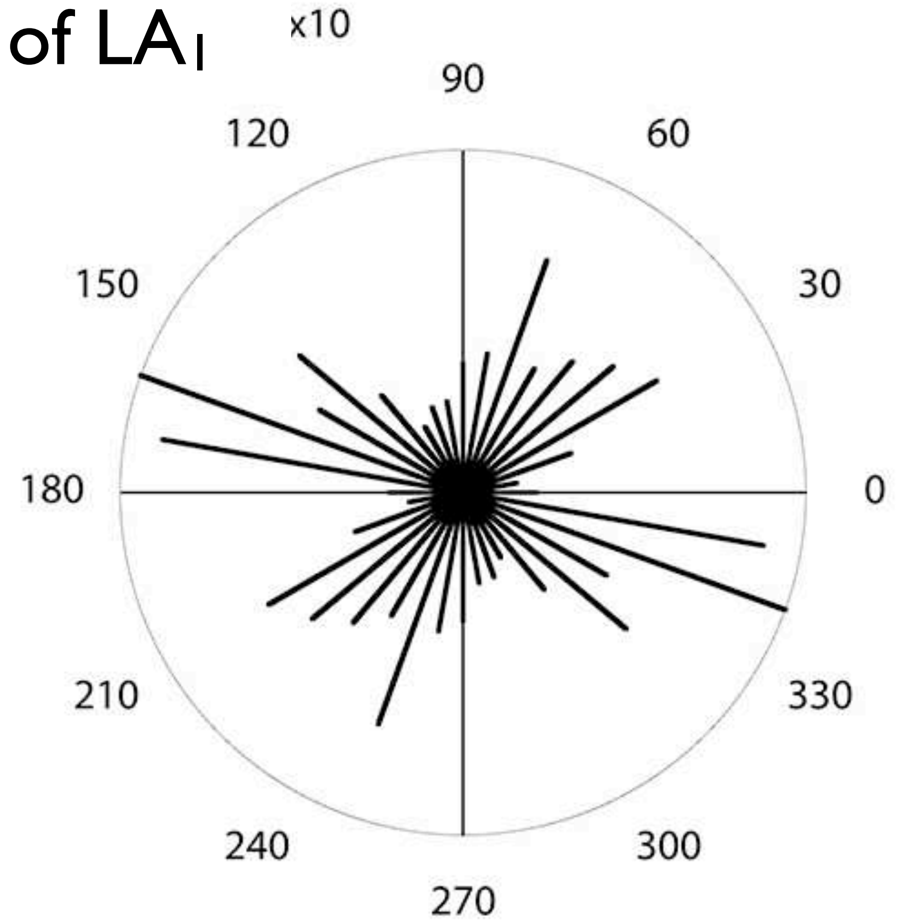
angle	rel_length_of_proj
0	0.98680
10	1.00000
20	0.99866
30	0.98882
40	0.97496
50	0.95985
60	0.94887
70	0.94288
80	0.94231
90	0.94887
100	0.97029
110	0.98089
120	0.98624
130	0.99029
140	0.99413
150	0.99608
160	0.99253
170	0.98331
180	0.98680



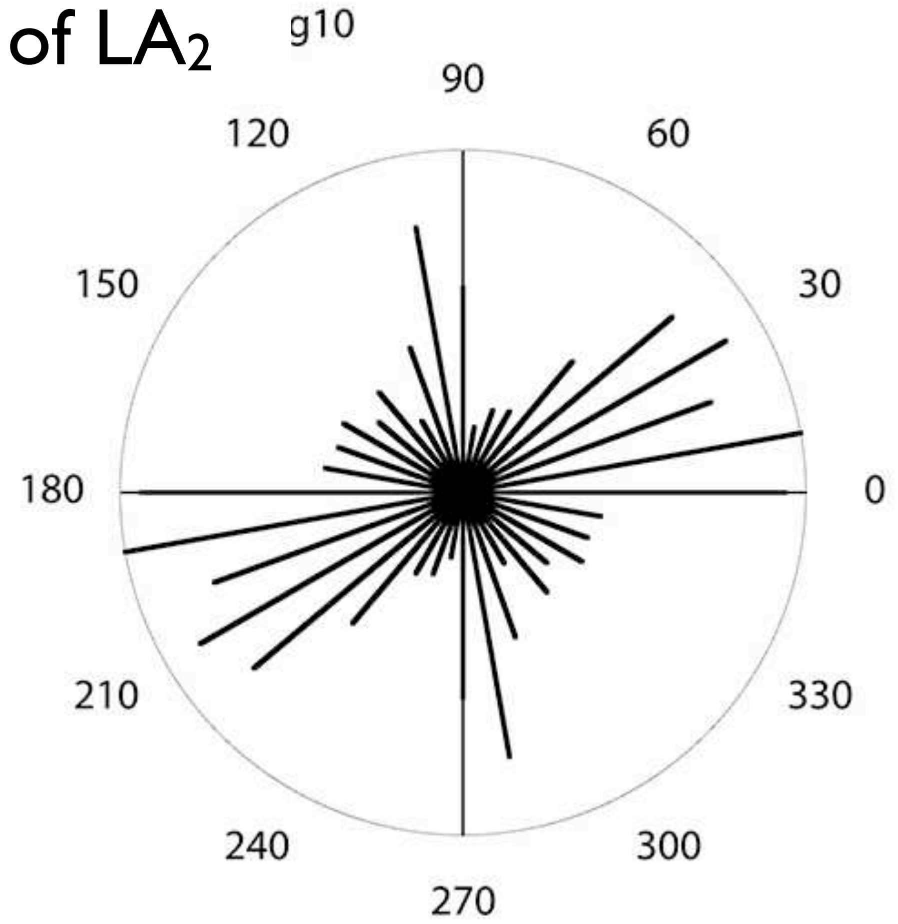
Software Box 14.4
PAROR output file gs172.cor.j10: Values of $B(\alpha)$ and plot.

```
 angle   rel_length_LA1  rel_length_LA2
     -180.0     0.21367     0.94366
     -175.0     0.00000     0.00000
     -170.0     0.15845     1.00000
     -165.0     0.00000     0.00000
     -160.0     0.33429     0.77693
     -155.0     0.00000     0.00000
     -150.0     0.65264     0.89880
     -145.0     0.00000     0.00000
     -140.0     0.57269     0.80994

.... etc.

      135.0     0.00000     0.00000
      140.0     0.62068     0.32597
      145.0     0.00000     0.00000
      150.0     0.48298     0.41040
      155.0     0.00000     0.00000
      160.0     1.00000     0.39790
      165.0     0.00000     0.00000
      170.0     0.88910     0.41206
      175.0     0.00000     0.00000
      180.0     0.21367     0.94366
```

ODF of LA_1



ODF of LA_2



Software Box 14.5
PAROR output file gs172.cor.x10: Length weighted orientation distributions (ODF) of long axes, LA_1 and LA_2, and rose diagrams. Intermediate zero values (at 5°, 15°, ... etc.) are inserted to facilitate plotting of the rose diagrams.

```
paror analysis of gs172.cor.scm
-----------------------------------------------

number of particles:   343

minimum number of points/particle :     3
maximum number of points/particle :  1000
increment of rotation :                10
```

#	longest(LA1)	shortest(SA1)	perp.L(SA2)	perp.S(LA2)	SA2/LA1	SA1/LA1	alfaLA1	alfaLA2	mkl	Xc	Yc
1	29.5026	24.8078	29.2895	28.2858	0.9928	0.8409	140.	100.	40.	930.24	-18.73
2	4.6351	3.7804	3.8694	3.7931	0.8348	0.8156	40.	0.	40.	1254.75	-7.01
3	31.1801	27.5646	28.0435	29.8744	0.8994	0.8840	150.	0.	-30.	1269.88	-20.06
4	29.9597	24.5553	25.2841	29.8036	0.8439	0.8196	60.	50.	10.	1202.01	-20.69
5	18.5911	13.4676	13.7404	18.2917	0.7391	0.7244	110.	120.	-10.	580.51	-20.60
6	63.9011	59.7227	60.3972	62.8714	0.9452	0.9346	100.	40.	60.	555.33	-43.85
7	46.6194	38.0730	38.2518	44.6852	0.8205	0.8167	130.	110.	20.	792.63	-36.75
8	24.3700	20.7269	21.7226	23.7549	0.8914	0.8505	170.	0.	-10.	1145.09	-29.18
9	13.1649	8.9011	8.9036	13.0755	0.6763	0.6761	50.	40.	10.	340.97	-26.89
10	72.8184	66.3386	68.1621	69.0571	0.9361	0.9110	70.	30.	40.	694.44	-56.23
11	8.5161	5.7747	5.9877	7.7660	0.7031	0.6781	160.	0.	-20.	1164.60	-25.83
12	63.8346	43.2561	46.0511	63.4958	0.7214	0.6776	0.	10.	-10.	1236.91	-45.41
13	16.1638	13.7806	14.8526	14.7670	0.9189	0.8526	60.	90.	-30.	1072.67	-31.97
14	22.4911	12.9760	14.0573	22.3257	0.6250	0.5769	110.	120.	-10.	729.91	-35.82
15	34.8403	22.8076	22.8076	34.8403	0.6546	0.6546	100.	100.	0.	187.99	-45.67
16	56.1935	50.1285	52.2959	54.6604	0.9306	0.8921	70.	50.	20.	275.06	-53.77
17	44.3838	34.9235	35.6008	44.0069	0.8021	0.7869	80.	90.	-10.	434.05	-48.03
18	25.7133	13.6912	13.7793	25.5773	0.5359	0.5325	90.	100.	-10.	486.00	-40.85
19	35.8567	21.2694	22.9016	35.0314	0.6387	0.5932	110.	100.	10.	511.97	-46.75
20	42.9562	29.2222	31.3816	42.0580	0.7305	0.6803	30.	10.	20.	1303.04	-45.06
21	60.2673	38.3636	40.1192	60.0673	0.6657	0.6366	160.	150.	10.	614.09	-53.61
22	6.0305	4.7959	5.3902	5.7143	0.8938	0.7953	140.	90.	50.	1172.68	-33.68
23	17.2685	14.7920	16.5276	16.7043	0.9571	0.8566	110.	90.	20.	1091.26	-41.03
24	69.8852	64.0367	65.3091	67.8792	0.9345	0.9163	60.	40.	20.	331.27	-71.11
25	29.8251	20.4206	22.2847	28.2261	0.7472	0.6847	70.	100.	-30.	467.30	-53.31

.... etc.

Software Box 14.6
PAROR output file gs172.cor.d10: Axes, axial ratios and orientations of particles:
= number of analyzed particle;
longest (LA1) = longest projection, shortest (SA1) = shortest projection of particle;
perp.(SA2) = projection perpendicular to longest, perp.(LA2) = projection perpendicular to shortest projection of particle;
SA2/LA1 = axial ratio (= short / long axis) based on LA1 = longest projection;
SA1/LA1 = minimum possible value for axial ratio;
alfaLA1 = orientation of longest projection;
alfaLA2 = orientation of normal to shortest projection;
mkl = angular difference between the orientations of LA_1 and LA_2;
X_c and Y_c = center point coordinates of particles calculated as the average x- and the average y-coordinate of the points digitized on the outline.
Angles are CCLW from positive x-axis.

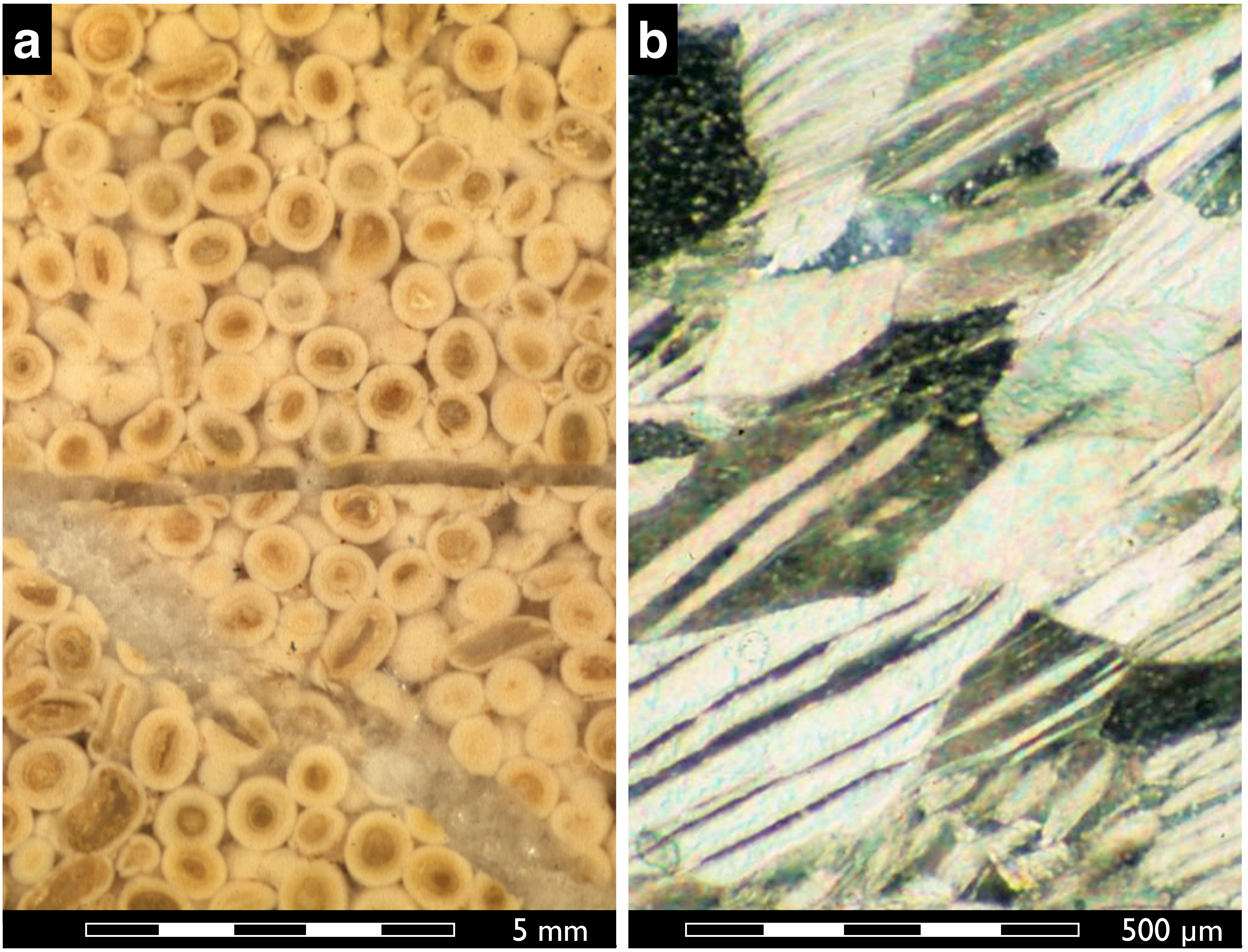


Figure 14.11
Natural examples for particle fabric analysis.
(a) Oolithic limestone of the Hauptrogenstein formation, Jura Mountains, polished surface;
(b) experimentally deformed Carrara marble, thin section, polarized light, sample CT1 600°, intracrystalline slip regime, $\gamma = 1.22$.

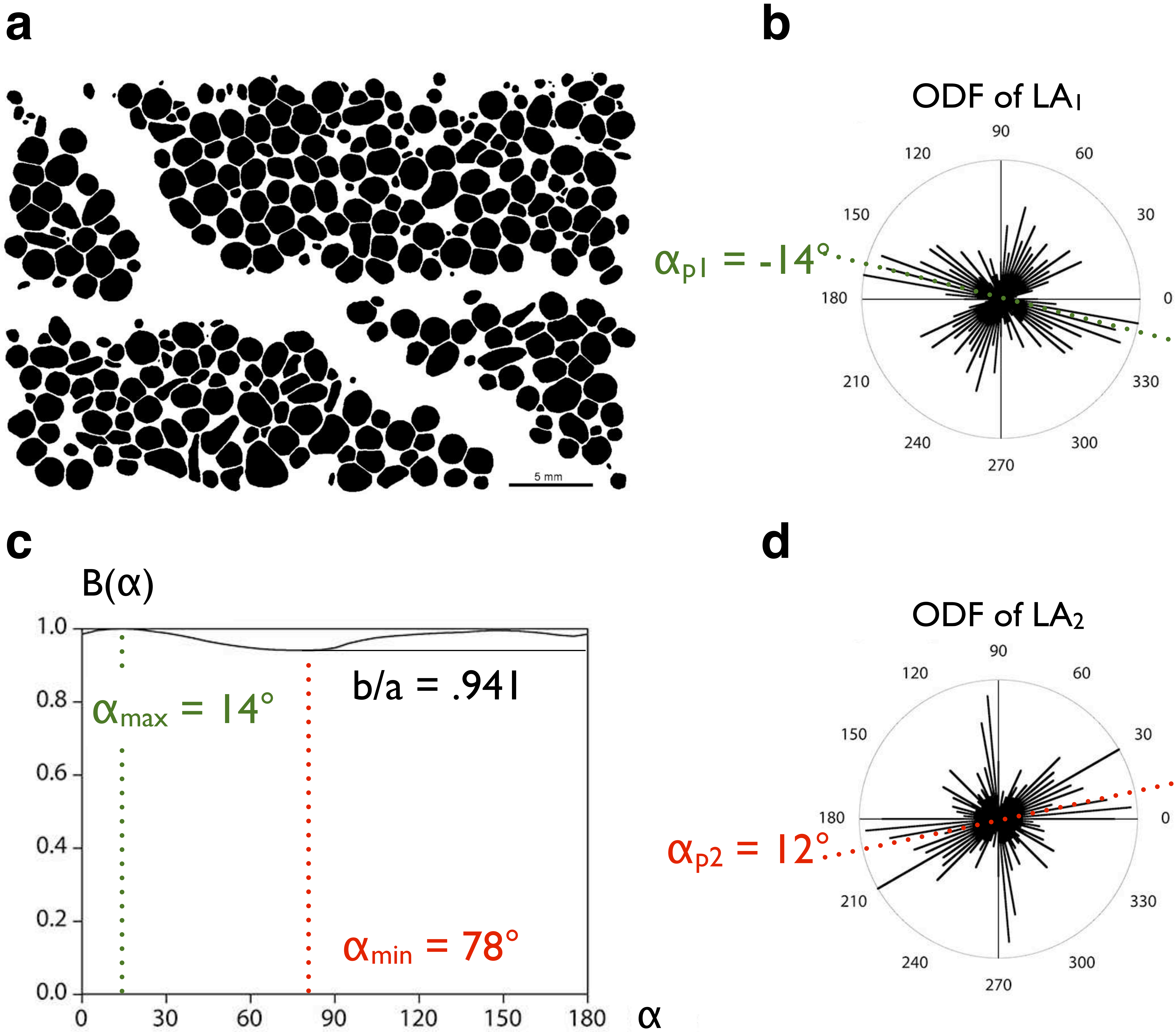


Figure 14.12
PAROR analysis of an oolithic limestone.
(a) Bitmap of fabric (prepared from acetate peel of GS 172);
(b) projection curve $B(\alpha)$ of gs172.cor.scm;
(c) rose diagrams of long axes of particles (5° resolution) using LA_1 axes(longest projections of particles);
(d) same as (c) using LA_2 axes (= projections normal to the shortest projection).
The bulk preferred orientations, α_{p1} (green) and α_{p2} (red), calculated from α_{max} and α_{min}, respectively, are superposed on the rose diagrams. (The exact values for b/a, α_{p1} and α_{p2} were derived from analyses made with 1° increment of rotation).

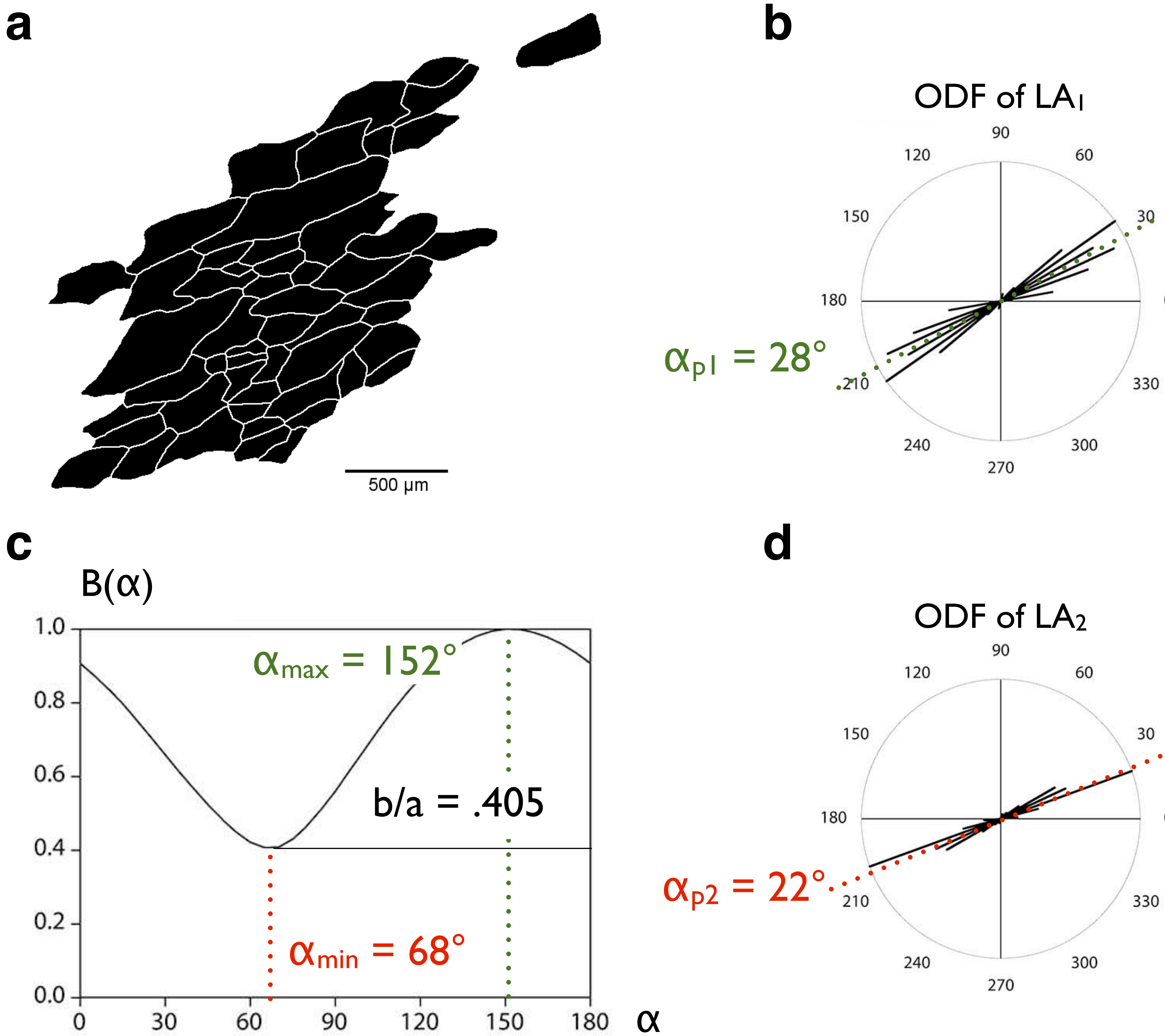


Figure 14.13
PAROR analysis of an experimentally sheared marble.
(a) Bitmap of fabric (prepared from sample CT1);
(b) projection curve B(α) of CT1.cor.scm;
(c) rose diagrams of long axes of particles (5° resolution) using LA_1 axes (longest projections of particles);
(d) same as (c) using LA_2 axes (= projections normal to the shortest projection).
The bulk preferred orientations, α_{p1} (green) and α_{p2} (red), calculated from α_{max} and α_{min}, respectively, are superposed on the rose diagrams. (The exact values for b/a, α_{p1} and α_{p2} were derived from analyses made with 1° increment of rotation).

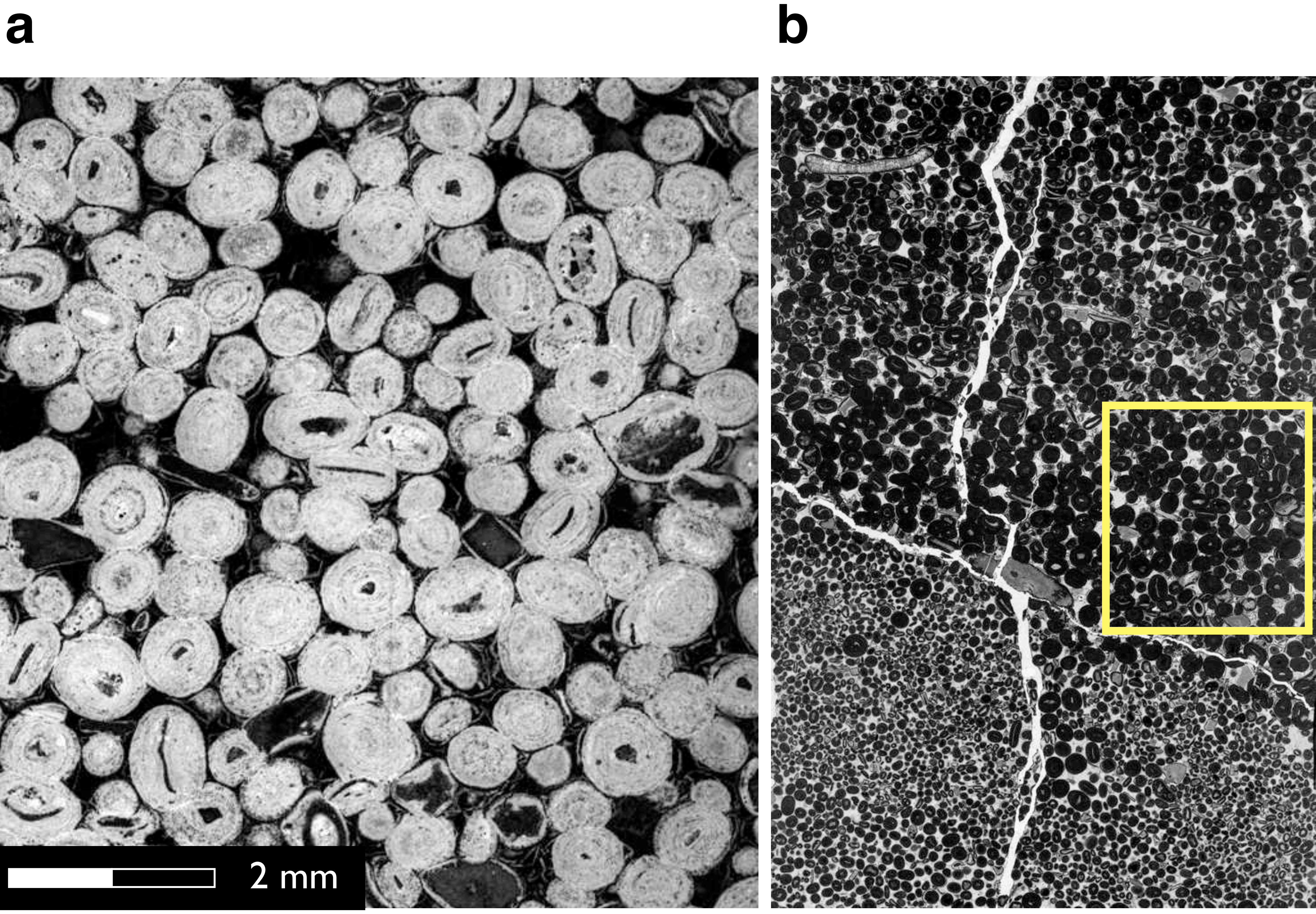


Figure 14.14
Over-packed oolithic limestone with grain-to-grain pressure solution contacts.
(a) Analyzed area of thin section, inverted contrast, showing packing of ooides.
(b) entire thin section (area shown = 21 · 32 mm^2), transmitted light; rectangle denotes analyzed area. (Sample courtesy Samuel Mock).

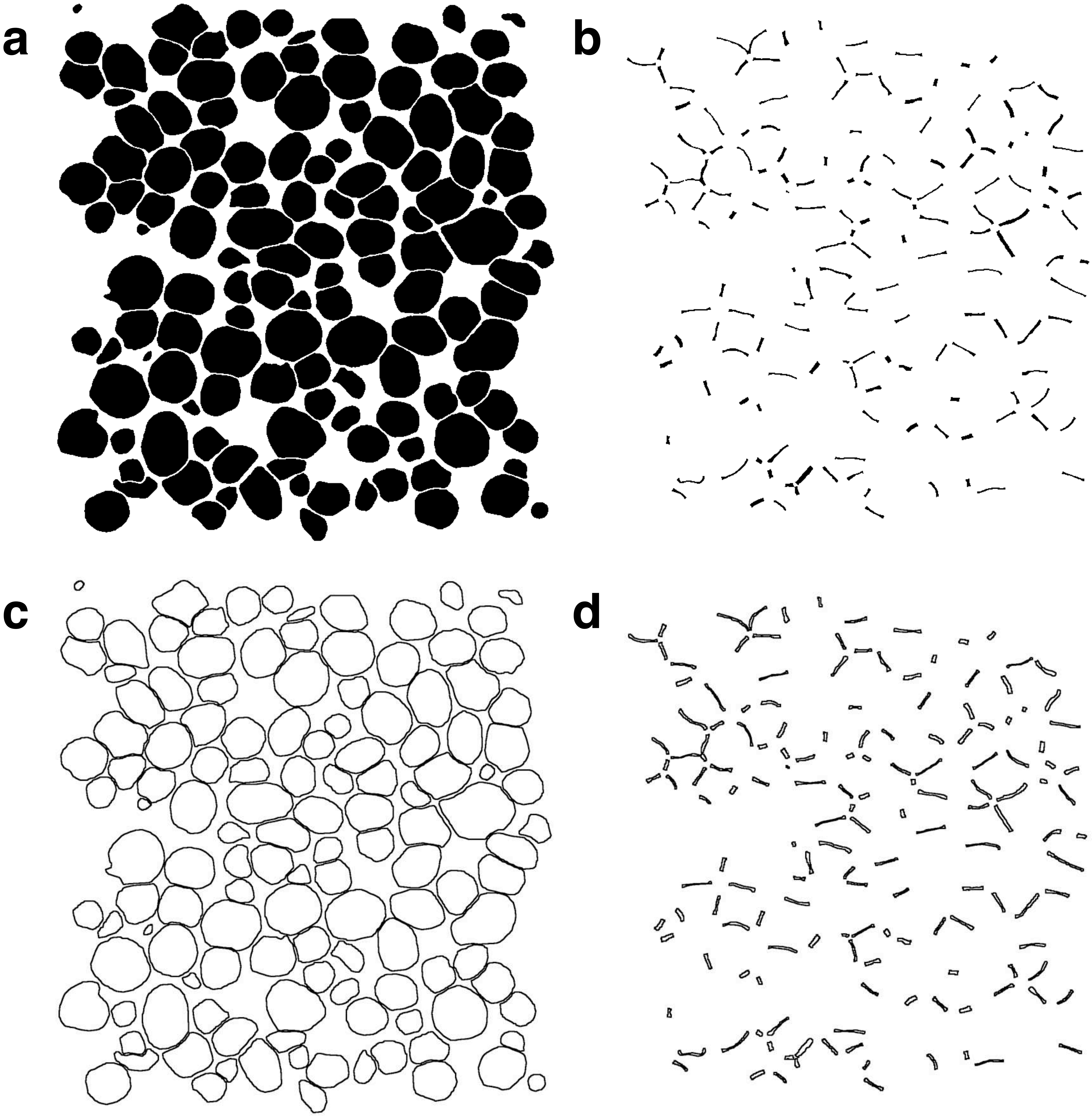


Figure 14.15
Ooides and pressure solution grain-to-grain contacts.
(a) Bitmap of ooides (b) bitmap of contact surfaces;
(c) outlines of ooides (d) outlines of contact surfaces.

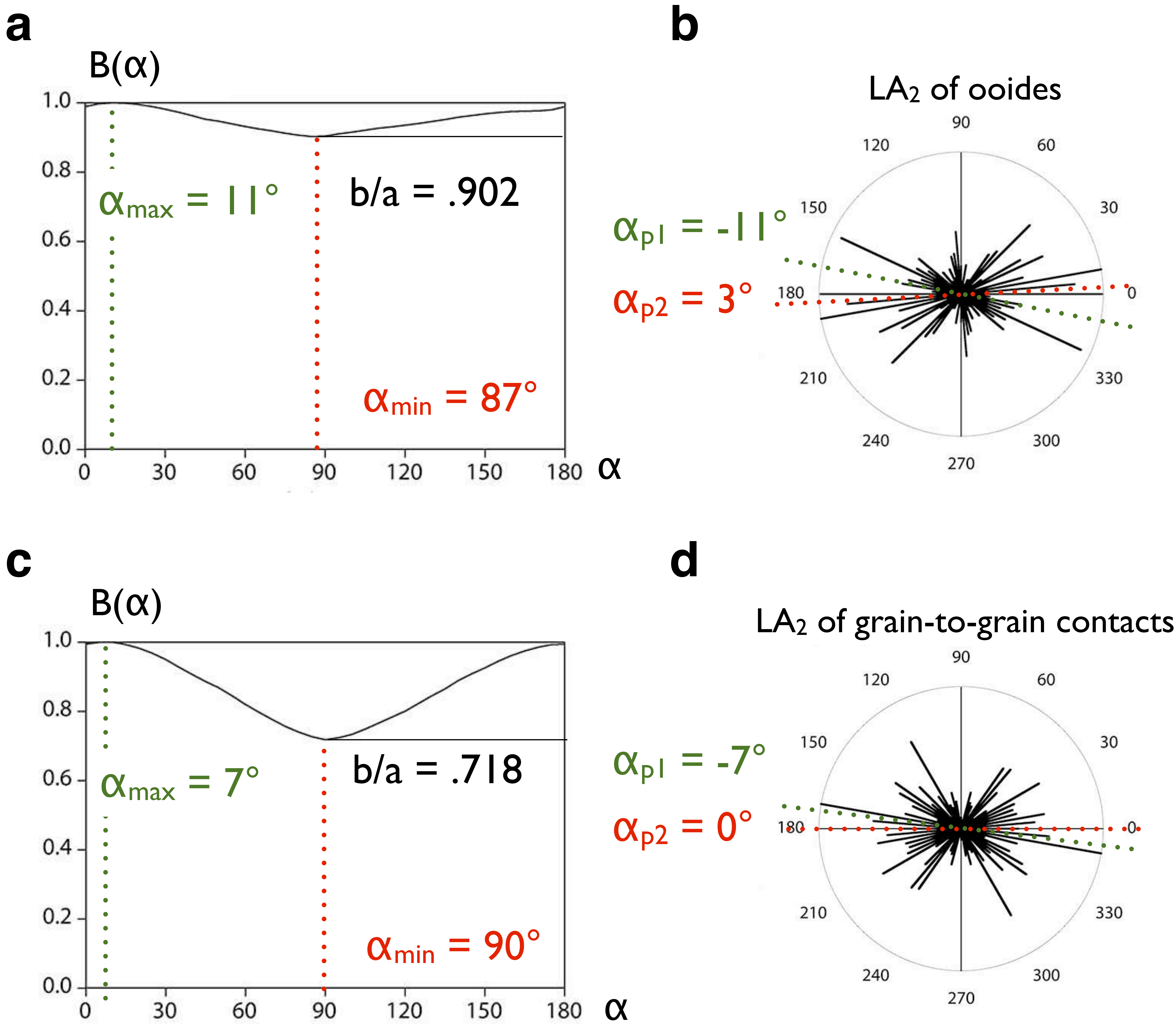
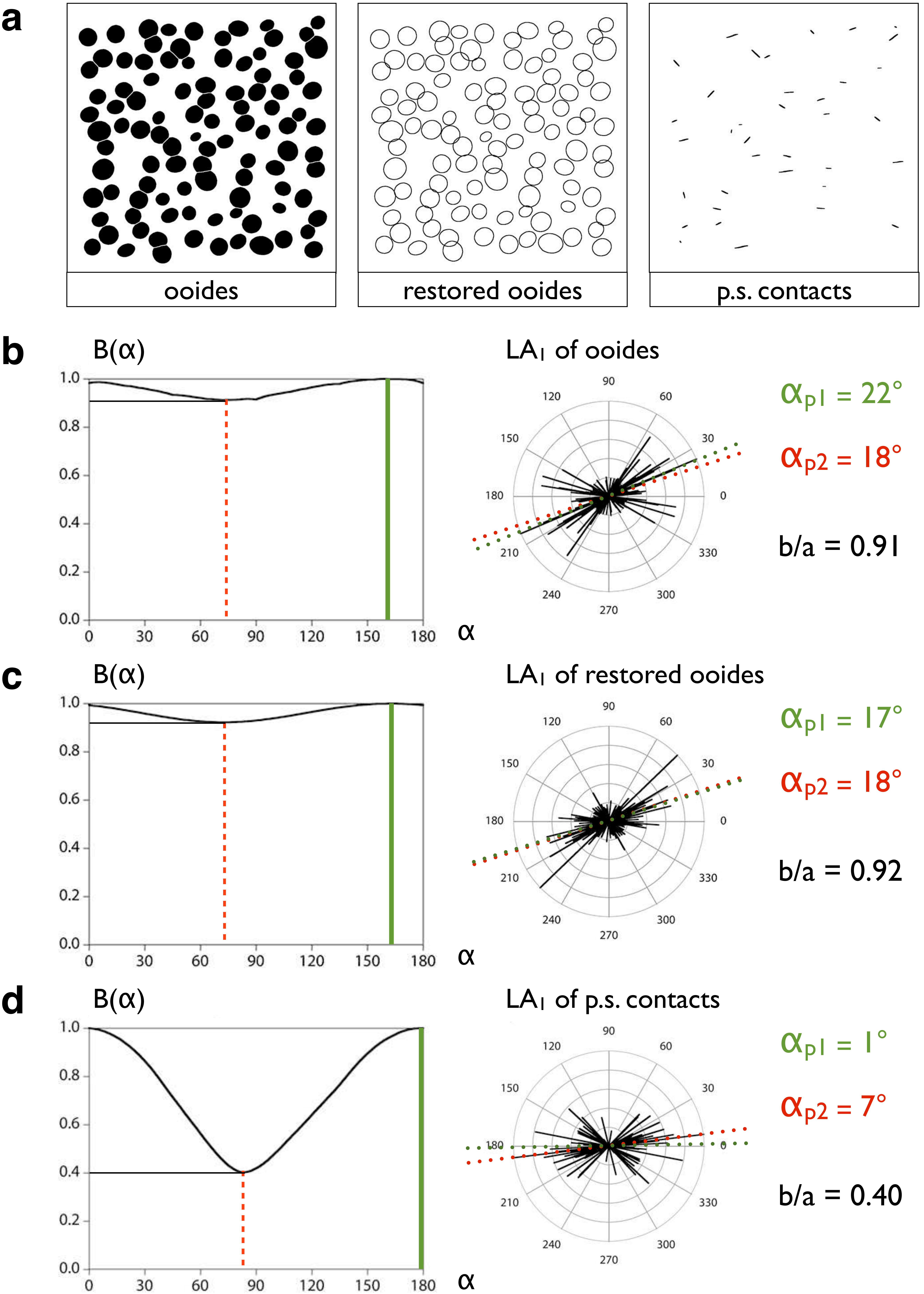


Figure 14.16
PAROR analysis of ooides and grain-to-grain contacts.
(a) projection curve $B(\alpha)$ of the ooides (outlines in file oo.cor.scm);
(b) projection curve $B(\alpha)$ of contact areas (outlines in ps.cor.scm);
(c) rose diagrams of long axes of ooides (results file oo.cor.r05, 5° resolution):
(d) rose diagrams of long axes of contact areas (result file ps.cor.r05, 5° resolution): LA_2 = long axes defined by the projection normal to the shortest projection.
Superposed in (c) to (d) are the preferred orientations, α_{p1} (red) and α_{p2} (green), derived from α_{max} and α_{min}; the exact values for b/a, α_{min} and α_{max} were derived from analyses made with 1° increment of rotation.



a
ooides
restored ooides
p.s. contacts
b
B(α)
LA1 of ooides
αp1 = 22°
αp2 = 18°
b/a = 0.91
c
B(α)
LA1 of restored ooides
αp1 = 17°
αp2 = 18°
b/a = 0.92
d
B(α)
LA1 of p.s. contacts
αp1 = 1°
αp2 = 7°
b/a = 0.40
α

Figure 14.17
Restoring outlines - recreating 'fossil' fabrics.
(a) From left to right: Bitmap of present day ooides with pressure solution grain-to-grain contact; outlines of restored ooides; outlines of pressure solution contacts;
(b) to (d) PAROR analysis of present day ooides (b), of restored ooides (c) and of pressure solution contacts (d); particle projection, $B(\alpha)$, is shown on left; ODF of long axes, LA_1, on right; preferred orientations, α_{p1} (green) and α_{p2}, (red) are superposed on rose diagram, the value for $b/a = B(\alpha)_{min} / B(\alpha)_{max}$, is indicated.

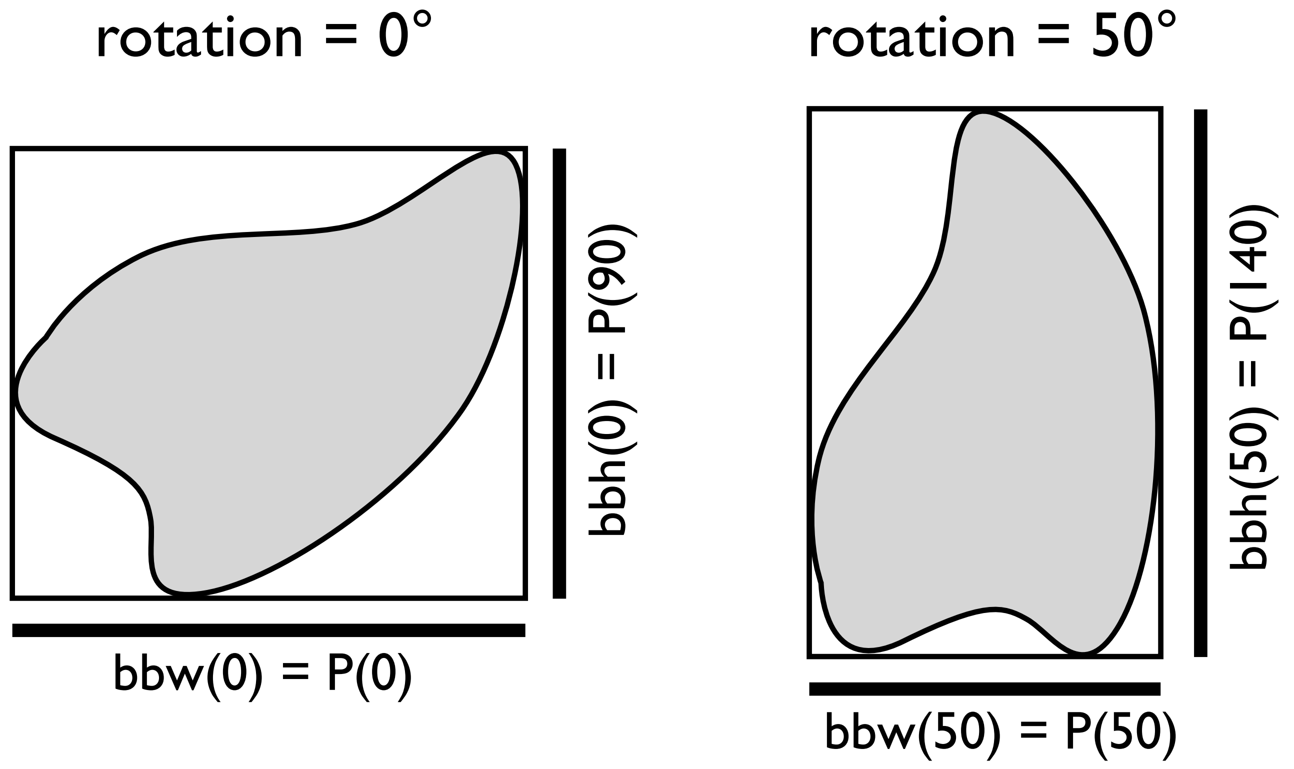


Figure 14.18
Concept of bounding box.
At any given orientation of the outline, the width of the bounding box, bbw(α), corresponds to the length of projection on the x-axis, i.e., to P(α); the height of the bounding box, bbh(α), to the projection on the y-axis, i.e., to P(α + 90°).

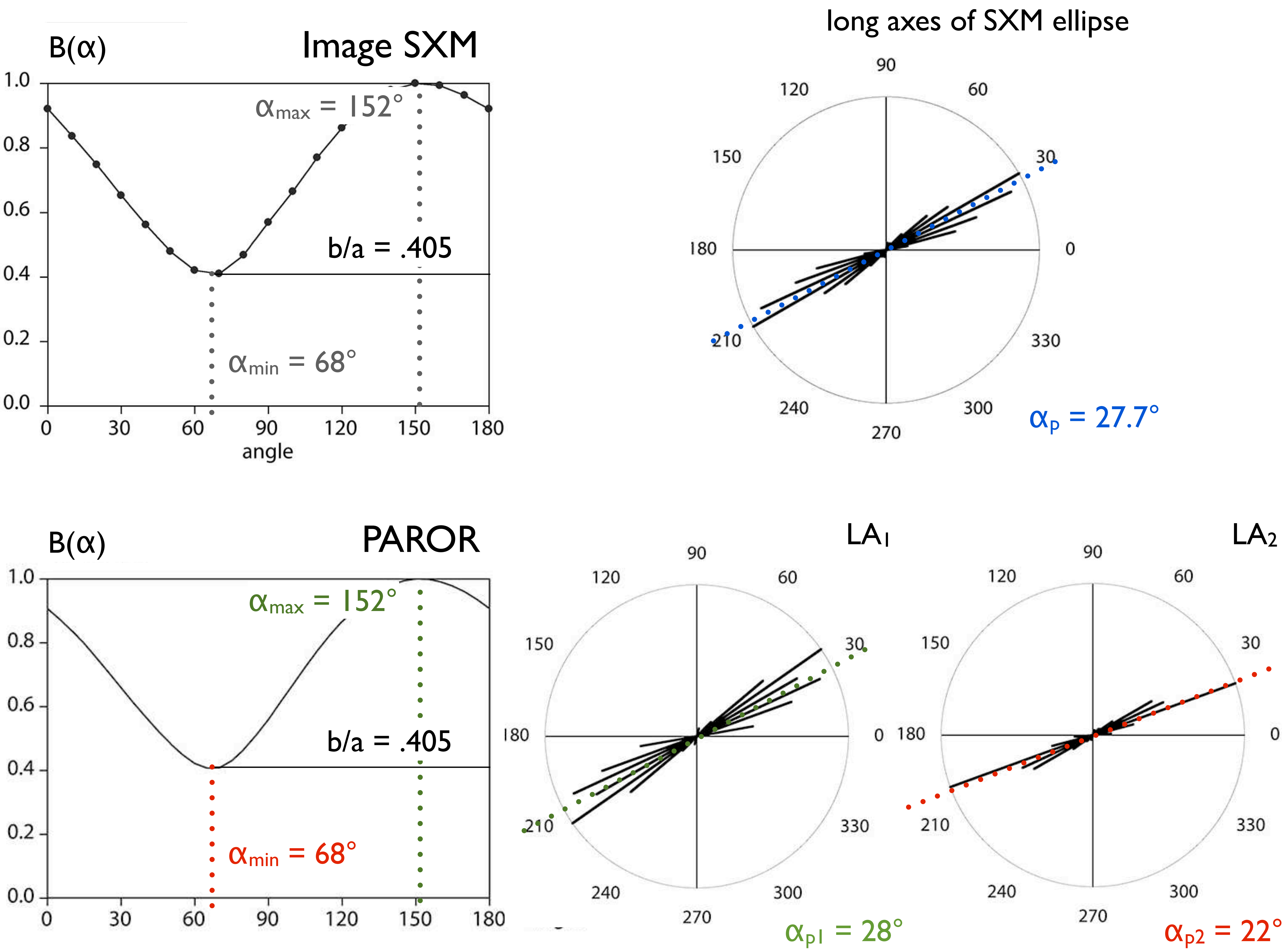


Figure 14.19
Comparison of PAROR and bounding box results for sample CT1 (Figure 14.13).
Left: projection curves B(α): top: calculated using bounding boxes of Image SXM at 10° intervals; bottom: using PAROR projections at 1° interval (bottom);
Right: rose diagrams of long axes of particles (5° resolution): top: ODF of the long axes of SXM best-fit ellipses; bottom: ODF of the longest projections LA_1 and projections normal to the shortest LA_2.
All rose diagrams are length weighted; in blue: average orientation of the long axes of the SXM ellipses; in green and red: the bulk preferred orientations, α_{p1} and α_{p2}, calculated from α_{max} and α_{min}, respectively, and superposed on the rose diagrams; the exact values for b/a, α_{p1} and α_{p2} were derived from analyses made with 1° increment of rotation.