

Krinov Data

1. Data files

\KRINOV folder contains the eight files in table 1, each of which corresponds to a category of outdoor objects in Krinov's original report.

Table 1 Files stored in \KRINOV folder.

Classification	File name	No. of colours
Forests and shrubs	krinov1.org	49
Grass	krinov2.org	119
Mosses and lichens	krinov3.org	7
Field and garden crops	krinov4.org	54
Bare areas and soils	krinov5.org	89
Roads	krinov6.org	14
Water surfaces and snow	krinov7.org	22
Buildings and building materials	krinov8.org	16

2. Measured objects

Measured objects are described under a keyword 'SAMPLE_LOC' in data headers. They are summarised in table 2 according to the original report. The table is divided according to the object categories.

Table 2-1 Objects whose reflectances are stored in \krinov1.org [Forests and shrubs (49 colours)]

SAMPLE_ID	SAMPLE_LOC
1	Birch: Shoots, full leaf:A=45deg;<=45deg:n.f.b.
2	Birch: Young forest; Winter stage:A=225deg:n.f.b.
3	Birch: Young forest; Young leaf:A=225deg:n.f.b.
4	Birch: Young forest; Full leaf:A=225deg:n.f.b.
5	Birch: Young forest; Late summer:A=225deg:n.f.b.
6	Birch: Mature forest; Winter stage:A=225deg:n.f.b.
7	Birch: Mature forest; Young leaf:A=25deg:n.f.b.
8	Birch: Mature forest; Full leaf:A=225deg:n.f.b.
9	Birch: Mature forest; Late summer:A=225deg:n.f.b.
10	Birch: Dwarf; Full leaf: A normal: tundra
11	Birch: Dwarf; Fresh back on a mature tree:A=225deg:n.f.b.
12	Elm: Mature forest; Young leaf:A=225deg:n.f.b.
13	Elm: Mature forest; Full leaf:A=225deg:n.f.b.
14	Oak: Young forest; Winter stage:A=225deg:n.f.b.
15	Oak: Mature forest; Full leaf:A=225deg:n.f.b.
16	Oak: Mature forest; Autumn colour:A=225deg:n.f.b.
17	Fir: Young forest; Winter stage:A=225deg:n.f.b.
18	Fir: Young forest; Young leaf:A=225deg:n.f.b.
19	Fir: Young forest; Full leaf:A=225deg:n.f.b.
20	Fir: Young forest; Late summer:A=225deg:n.f.b.

21	Fir: Mature forest; Winter stage:A=225deg;n.f.b.
22	Fir: Mature forest; Young leaf:A=225deg;n.f.b.
23	Fir: Mature forest; Full leaf:A=225deg;n.f.b.
24	Fir: Mature forest; Late summer:A=225deg;n.f.b.
25	Fir: Mature forest; Late summer: from the air alt.=300m.:n.f.b.
26	Willow: Shrubs; Late summer:A=45deg,at about 1.5km.:steppe
27	Black elm: Mature forest; Late summer, heavily coated with dust:A=225deg;desert
28	Linden: Mature forest; Winter stage:A=225deg;n.f.b.
29	Linden: Mature forest; Full leaf:A=225deg;n.f.b.
30	Linden: Mature forest; Autumn colour:A=225deg;n.f.b.
31	Larch: Young forest; Winter stage:A=225deg;n.f.b.
32	Larch: Young forest; Young leaf:A=225deg;n.f.b.
33	Larch: Young forest; Full leaf:A=225deg;n.f.b.
34	Juniper: Mature forest; Full leaf: A normal: tundra
35	Alder: Young forest; Young leaf:A=225deg;n.f.b.
36	Aspen: Young forest; Winter stage:A=225deg;n.f.b.
37	Aspen: Young forest; Young leaf:A=225deg;n.f.b.
38	Aspen: Young forest; Full leaf:A=225deg;n.f.b.
39	Aspen: Mature forest; Young leaf:A=225deg;n.f.b.
40	Aspen: Mature forest; Full leaf:A=225deg;n.f.b.
41	Aspen: Mature forest; Late summer:A=225deg;n.f.b.
42	Aspen: Mature forest; Autumn colour:A=225deg;n.f.b.
43	Haloxylon: Mature trees; Late summer green: A=45deg; <=45deg; desert
44	Haloxylon: Mature trees; Dry:A=45deg; <=45deg;desert
45	Pine: Young forest; Young leaf:A=135deg;n.f.b.
46	Pine: Young forest; Full leaf:A=135deg;n.f.b.
47	Pine: Mature forest; Winter stage:A=225deg;n.f.b.
48	Pine: Mature forest; Young leaf:A=225deg;n.f.b.
49	Pine: Mature forest; Full leaf:A=225deg;n.f.b.

Table 2-2 Objects whose reflectances are stored in \krinov2.org [Grass (119 colours)]

SAMPLE_ID	SAMPLE_LOC
50	Weeds: Dense growth, drying and brownish (beginning of autumn):Cloudy sky. Normal: forest steppe
51	Weeds: Dense growth, drying and brownish (beginning of autumn): Cloudy sky. Normal <=30deg: forest steppe
52	Weeds: Dense growth, drying and brownish (beginning of autumn): A=90deg; <=45deg: steppe
53	Heather: Dense growth, before flowering: Normal: tundra
54	River valley with meadows: General view from a distance of about 3 km.; covered with trees and meadows, end of summer:A=90deg;mountainous
55	Willow herb: Dense growth, in the flowering period:A=90deg;<=45deg;tundra
56	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer: Normal: desert
57	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=0deg;<=30deg;desert
58	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=0deg;<=60deg;desert
59	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=0deg;<=75deg;desert
60	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=90deg;<=30deg;desert
61	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=90deg;<=60deg;desert
62	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=90deg;<=75deg;desert
63	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=180deg;<=30deg;desert

64	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=180deg;<=60deg:desert
65	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=180deg;<=75deg:desert
66	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=270deg;<=30deg:desert
67	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=270deg;<=60deg:desert
68	Ilyas :Sparse and dry (yellowish)grass on sand at the end of summer:A=270deg;<=75deg:desert
69	Reeds: In a lake near the bank; bright green(beginning of autumn):A=90deg:forest steppe
70	Turf hillocks: Covered with grass(European blueberry, etc.)in the summer: Normal: tundra
71	Edge of ravine: Covered with sparse grass almost dry (beginning of autumn): Normal: mountainous
72	Edges of river bank: Covered with sparse grass almost dry (beginning of autumn): Normal: steppe
73	Alpine meadow: On mountain tops, covered with sparse grass, dried (beginning of autumn): Normal: mountainous
74	Alpine meadow: On mountain tops, covered with sparse grass, dried (beginning of autumn), mowed: Normal: mountainous
75	Pasture meadow: At end of summer: Normal: black earth
76	Pasture meadow: At end of summer:A=90deg;<=45deg:black earth
77	Pasture meadow: At end of summer:A=180deg;<=45deg:black earth
78	Pasture meadow: At end of summer, wet after rain: Cloudy sky normal: forest steppe
79	Pasture meadow: At end of summer, wet after rain: Cloudy sky <=30deg:forest steppe
80	Pasture meadow: At end of summer, wet after rain: Cloudy sky <=60deg:forest steppe
81	Pasture meadow: At the beginning of autumn: Normal: mountainous
82	Meadow with clover and timothy: Dense growth, with flowers,mid-summer:A=90deg;<=45deg:n.f.b.
83	Meadow with clover and timothy: Dense growth, with flowers,mid-summer:A=90deg;<=65deg:n.f.b.
84	Meadow with clover and timothy: Dense growth, with flowers,mid-summer:A=90deg;<=85deg:n.f.b.
85	Meadow with clover and timothy: Mowed:A=90deg;<=45deg:n.f.b.
86	Meadow with clover and timothy: Mowed, wet after rain: Cloudy sky<=45deg:n.f.b.
87	Meadow with clover and timothy: Mowed, wet after rain: Cloudy sky<=65deg:n.f.b.
88	Meadow with clover and timothy: Mowed, wet after rain: Cloudy sky<=85deg:n.f.b.
89	Meadow with crow foot: Dense grass with abundant flowers:A=90deg;<=45deg:n.f.b.
90	Meadow with crow foot: Dense grass with abundant flowers:A=90deg;<=65deg:n.f.b.
91	Meadow with crow foot: Dense grass with abundant flowers:A=90deg;<=85deg:n.f.b.
92	Sedge meadow: Dense grass in mid-summer:A=90deg;<=45deg:n.f.b.
93	Meadow with daisies: In the period of abundant bloom:A=90deg;<=45deg:n.f.b.
94	Lush meadow(flood land):With lush dense grass at the beginning of autumn before mowing: Normal: mountainous
95	Dry meadow: With dense short grass in mid-summer: Normal; altitude of sun 25deg:n.f.b.
96	Dry meadow: With dense short grass in mid-summer:A=0deg;<=15deg:n.f.b.
97	Dry meadow: With dense short grass in mid-summer:A=0deg;<=30deg:n.f.b.
98	Dry meadow: With dense short grass in mid-summer:A=0deg;<=45deg:n.f.b.
99	Dry meadow: With dense short grass in mid-summer:A=0deg;<=60deg:n.f.b.
100	Dry meadow: With dense short grass in mid-summer:A=0deg;<=75deg:n.f.b.
101	Dry meadow: With dense short grass in mid-summer:A=90deg;<=15deg:n.f.b.
102	Dry meadow: With dense short grass in mid-summer:A=90deg;<=30deg:n.f.b.
103	Dry meadow: With dense short grass in mid-summer:A=90deg;<=45deg:n.f.b.
104	Dry meadow: With dense short grass in mid-summer:A=90deg;<=60deg:n.f.b.
105	Dry meadow: With dense short grass in mid-summer:A=90deg;<=75deg:n.f.b.
106	Dry meadow: With dense short grass in mid-summer:A=180deg;<=15deg:n.f.b.
107	Dry meadow: With dense short grass in mid-summer:A=180deg;<=30deg:n.f.b.
108	Dry meadow: With dense short grass in mid-summer:A=180deg;<=45deg:n.f.b.
109	Dry meadow: With dense short grass in mid-summer:A=180deg;<=60deg:n.f.b.
110	Dry meadow: With dense short grass in mid-summer:A=180deg;<=75deg:n.f.b.

111	Dry meadow: With dense short grass in mid-summer: A=270deg; <=45deg: n.f.b.
112	Dry meadow: With dense short grass in mid-summer: A=270deg; <=60deg: n.f.b.
113	Dry meadow: With dense short grass in mid-summer: A=270deg; <=75deg: n.f.b.
114	Dry meadow: With dense short grass in mid-summer: Normal; alt. of sun=45deg: n.f.b.
115	Dry meadow: With dense short grass in mid-summer: A=0deg; <=15deg: n.f.b.
116	Dry meadow: With dense short grass in mid-summer: A=0deg; <=30deg: n.f.b.
117	Dry meadow: With dense short grass in mid-summer: A=0deg; <=45deg: n.f.b.
118	Dry meadow: With dense short grass in mid-summer: A=0deg; <=60deg: n.f.b.
119	Dry meadow: With dense short grass in mid-summer: A=0deg; <=75deg: n.f.b.
120	Dry meadow: With dense short grass in mid-summer: A=90deg; <=15deg: n.f.b.
121	Dry meadow: With dense short grass in mid-summer: A=90deg; <=30deg: n.f.b.
122	Dry meadow: With dense short grass in mid-summer: A=90deg; <=45deg: n.f.b.
123	Dry meadow: With dense short grass in mid-summer: A=90deg; <=60deg: n.f.b.
124	Dry meadow: With dense short grass in mid-summer: A=90deg; <=75deg: n.f.b.
125	Dry meadow: With dense short grass in mid-summer: A=180deg; <=15deg: n.f.b.
126	Dry meadow: With dense short grass in mid-summer: A=180deg; <=30deg: n.f.b.
127	Dry meadow: With dense short grass in mid-summer: A=180deg; <=45deg: n.f.b.
128	Dry meadow: With dense short grass in mid-summer: A=180deg; <=60deg: n.f.b.
129	Dry meadow: With dense short grass in mid-summer: A=180deg; <=75deg: n.f.b.
130	Dry meadow: With dense short grass in mid-summer: A=270deg; <=15deg: n.f.b.
131	Dry meadow: With dense short grass in mid-summer: A=270deg; <=30deg: n.f.b.
132	Dry meadow: With dense short grass in mid-summer: A=270deg; <=45deg: n.f.b.
133	Dry meadow: With dense short grass in mid-summer: A=270deg; <=60deg: n.f.b.
134	Dry meadow: With dense short grass in mid-summer: A=270deg; <=75deg: n.f.b.
135	Dry meadow: With sparse low grass: Normal: n.f.b.
136	Dry meadow: With sparse low grass: A=90deg; <=45deg: n.f.b.
137	Dry meadow: With sparse low grass: A=90deg; <=75deg: n.f.b.
138	Dry meadow: With more dense low grass: Normal: n.f.b.
139	Dry meadow: With more dense low grass: A=90deg; <=45deg: n.f.b.
140	Dry meadow: With more dense low grass: A=180deg; <=45deg: n.f.b.
141	Dry meadow: With sparse dry grass on hills beginning of autumn: Normal: mountainous
142	Dry meadow: With dense but low grass beginning of autumn: From aircraft alt.300m.: n.f.b.
143	Dry meadow: With more sparse grass, grazed: From aircraft alt.300m.: n.f.b.
144	Lake partially covered with vegetation: Surface of water is almost completely covered with vegetation (duckweed, sedge and others): A=90deg; <=60deg: forest steppe
145	Sedge: Dense near lake shore: A=90deg; <=45deg: forest steppe
146	Shallows of river(in high water): Covered with grass: Almost plumb: steppe
147	Plantain: Individual leaf (top surface): Normal: n.f.b.
148	Wormwood: Dense growth, flowering, at end of summer: Cloudy sky Normal: steppe and forest steppe
149	Wormwood: Dense growth, flowering, at end of summer: Cloudy sky Normal; <=30deg: steppe and forest steppe
150	Wormwood: Dense growth, flowering, at end of summer: Cloudy sky Normal; <=60deg: steppe and forest steppe
151	Stream: Surface covered with water weeds and sedge: A=90deg; <=45deg: n.f.b.
152	Duckweed: Dense bunched growth, light green, beginning of summer: A=90deg; <=45deg: n.f.b.
153	Selin: Individual clumps dried and yellowish on sand dunes at the end of summer: Normal: desert
154	Mountain side: With low sparse grass at the beginning of autumn: Normal: mountainous
155	Virgin steppe: With low grass burnt by the sun, beginning of autumn: Cloudy sky Normal: forest steppe
156	Virgin steppe: With low grass burnt by the sun, beginning of autumn: Cloudy sky Normal; <=30deg:

	forest steppe
157	Virgin steppe: With low grass burnt by the sun, beginning of autumn: Cloudy sky Normal;<=60deg:forest steppe
158	Virgin steppe: With low grass burnt by the sun, beginning of autumn, but fresher and wetter after rain :Cloudy sky Normal; Normal: forest steppe
159	Virgin steppe: With low grass burnt by the sun, beginning of autumn, but fresher and wetter after rain :Cloudy sky Normal;<=30deg:forest steppe
160	Virgin steppe: With low grass burnt by the sun, beginning of autumn, but fresher and wetter after rain :Cloudy sky Normal;<=60deg:forest steppe
161	Grass: Near road, dusty: Normal: steppe
162	Grass: Young, green:A=90deg;<=45deg:n.f.b.
163	Grass: Last year's(dry),spring:A=90deg;<=45deg:n.f.b.
164	Grass: summer green:A=90deg;<=45deg:n.f.b.
165	Yantak (camel grass):Road side, heavily dusted: Normal: desert
166	Fallow, green: Flowering: Normal: steppe
167	Hillside: Short grass: Normal: steppe
168	Hay: In stack,dry: A=110deg: mountainous

Table 2-3 Objects whose reflectances are stored in \krinov3.org [Mosses and lichens (7 colours)]

SAMPLE_ID	SAMPLE_LOC
169	Lichens: Greenish brown, on roadsides and foot paths over turf, dry: Normal: tundra
170	Moss: Reddish brown, wet: Normal: tundra
171	Sphagnum moss: In marshy lowland, wet: Normal: tundra
172	Sphagnum moss: In marshy lowland, wet, on bank of bog, dry : Normal: tundra
173	Moss on rocks: Dark green on mountain outcrops, dry: Normal: tundra
174	Moss on turf: Reddish brown, dry: Normal: tundra
175	Reindeer moss: On turf, dry Normal: tundra

Table 2-4 Objects whose reflectances are stored in \krinov4.org

[Field and garden crops (54 colours)]

SAMPLE_ID	SAMPLE_LOC
176	Vetch: Dense, bright green, before flowering:A=90deg;<=45deg:n.f.b.
177	Peas: To a considerable extent yellowed with bright green spots before ripening: A=90deg; <=45deg:n.f.b.
178	Buckwheat: Before blooming: A=90deg;<=45deg:n.f.b.
179	Cabbage: With well-developed heads:A=90deg;<=45deg:black earth
180	Potatoes: After flowering, dark green:A=90deg;<=45deg:black earth
181	White clover: Flowering period: A=90deg;<=45deg:n.f.b.
182	Red clover: Flowering period: A=90deg;<=45deg:n.f.b.
183	Red clover: Young grass after first mowing:A=90deg;<=45deg:black earth
184	Corn: Ripening period somewhat yellowish:A=90deg:steppe
185	Oats: Spike-forming period: Normal: tundra
186	Oats: With spikes:A=90deg;<=45deg:n.f.b.
187	Oats: With spikes:A=90deg;<=65deg:n.f.b.
188	Oats: With spikes:A=90deg;<=85deg:n.f.b.
189	Oats: With spikes, lighter in colour: Cloudy;<=45deg:n.f.b.
190	Oats: With spikes, lighter in colour: Cloudy;<=65deg:n.f.b.
191	Oats: With spikes, lighter in colour: Cloudy;<=85deg:n.f.b.
192	Sunflower: In bloom:A=90deg:black earth