Geological Magazine

Subduction-accretion complex with supra-subduction-zone ophiolite slices: Ankara Mélange, central Anatolia

Aral I. Okay, Demir Altıner, Taniel Danelian, Gültekin Topuz, Ercan Özcan, Andrew R.C. Kylander-Clark

Supplementary material

The supplementary material includes new U-Pb detrital zircon isotopic data from the sandstone sample (Supplementary Table 1), UTM coordinates of the geochemical and paleontological samples and photo localities (Supplemenary Table 2), cathodoluminescence images of the analyzed zircons (Supplementary Figure S1) and microphotographs of the Eocene foraminifera (Supplementary Figure S2) from the Beynam (Ankara) region. Below we also provide brief petrographic descriptions, microphotos and UTM coordinates of the analyzed samples. The UTM coordinates are based on the European 1979 Datum, which is compatible with the 1:25 000 scale maps used for mapping.

Table S1. New detrital U-Pb zircon data.

This Table include U-Pb isotope data from the detrital zircons from a sandstone sample from the base of the Haymana Formation, the fore arc turbidites.

U-Pb data collected at University of California Santa Barbara
Analytical protocols described in Kylander-Clark et al. (2013).
"Best Age" is the ^{207}Pb-corrected $^{206}Pb/^{238}U$ age, for dates younger than 1400 Ma, and the $^{207}Pb/^{206}Pb$ age for dates older than 14(

Sample 11169 - Detrital zircons from the sandstone from the base of the Haymana Formation, Beynam - location
UTM 36T 03 58 925 E - 44 45 703 N European 1978 datum

Zircon grains	U ppm	Th ppm	207Pb/ 235U	2σ	206Pb/ 238U	2σ	rho	238U/ 206Pb	2σ	207Pb/ 206Pb	2σ	rho	208Pb/ 232Th	2σ	Best Age	2σ	Concor-dance	Th/U
1	96	64	1.037	0.216	0.12	0.23	0.72	8.35	18.50	0.063	0.124	0.00	0.038	0.057	730	23	1.01	0.663
2	777	196	0.085	0.154	0.01	0.03	0.74	76.86	132.69	0.047	0.080	0.00	0.004	0.005	83	3	1.01	0.252
3	1305	255	0.086	0.009	0.01	0.07	0.72	76.16	159.62	0.047	0.077	0.00	0.004	0.006	84	3	1.01	0.195
4	1221	254	0.086	0.004	0.01	0.12	0.51	76.16	196.27	0.047	0.083	0.00	0.004	0.006	84	3	1.01	0.208
5	287	145	0.561	0.155	0.07	0.33	0.62	13.81	28.68	0.056	0.094	0.00	0.023	0.031	451	15	1.00	0.506
6	709	90	0.088	0.130	0.01	0.01	0.29	74.96	126.89	0.048	0.089	0.00	0.005	0.007	85	3	0.99	0.128
7	180	116	1.597	1.068	0.16	0.51	0.25	6.22	13.16	0.072	0.126	0.00	0.048	0.069	961	31	0.99	0.646
8	901	262	0.088	0.038	0.01	0.02	0.38	75.53	160.40	0.048	0.082	0.00	0.004	0.006	85	3	0.99	0.291
9	486	146	0.086	0.003	0.01	0.07	0.24	76.75	193.84	0.048	0.088	0.00	0.004	0.006	83	3	0.99	0.301
10	536	120	0.087	#DIV/0!	0.01	#DIV/0!	0.68	76.69	#DIV/0!	0.048	#DIV/0!	0.00	0.004	#DIV/0!	83	3	0.99	0.223
11	638	183	0.089	0.050	0.01	0.07	0.61	74.52	163.05	0.049	0.079	0.00	0.004	0.005	86	3	0.99	0.287
12	406	108	0.087	0.004	0.01	0.08	0.73	76.34	166.20	0.048	0.091	0.00	0.004	0.006	84	3	0.99	0.267
13	954	465	0.085	0.110	0.01	0.02	0.83	78.06	143.46	0.048	0.087	0.00	0.004	0.005	82	3	0.99	0.487
14	758	167	0.089	0.010	0.01	0.05	0.50	74.91	136.84	0.049	0.082	0.00	0.004	0.006	85	3	0.99	0.220
15	1230	346	0.088	0.060	0.01	0.06	0.22	75.59	152.03	0.048	0.089	0.00	0.004	0.005	85	3	0.99	0.281
16	943	231	0.086	0.155	0.01	0.01	0.45	77.40	149.93	0.049	0.090	0.00	0.004	0.006	83	3	0.99	0.244
17	471	174	0.086	0.023	0.01	0.08	0.34	78.03	148.18	0.049	0.079	0.00	0.004	0.005	82	3	0.98	0.368
18	47	48	1.510	1.932	0.15	0.87	0.80	6.54	12.45	0.072	0.120	0.00	0.047	0.062	915	32	0.98	1.013
19	1015	339	0.088	0.125	0.01	0.02	0.46	76.34	157.87	0.049	0.086	0.00	0.004	0.005	84	3	0.98	0.334
20	730	342	0.088	0.017	0.01	0.08	0.66	76.57	154.34	0.049	0.079	0.00	0.004	0.005	84	3	0.98	0.469
21	262	190	0.762	#DIV/0!	0.09	#DIV/0!	0.94	10.94	#DIV/0!	0.061	#DIV/0!	0.00	0.032	#DIV/0!	563	21	0.98	0.725
22	2096	653	0.086	0.113	0.01	0.01	0.65	77.88	154.47	0.049	0.086	0.00	0.004	0.006	82	3	0.98	0.312
23	620	208	0.086	0.021	0.01	0.15	0.35	78.06	178.24	0.049	0.079	0.00	0.004	0.005	82	3	0.98	0.336
24	797	342	0.087	0.004	0.01	0.06	0.56	77.94	170.82	0.049	0.092	0.00	0.004	0.006	82	3	0.98	0.429
25	598	245	0.484	1.025	0.06	0.05	0.81	16.06	26.86	0.056	0.101	0.00	0.022	0.028	388	12	0.97	0.410
26	240	205	1.506	0.375	0.15	0.79	0.79	6.62	15.66	0.072	0.126	0.00	0.044	0.058	903	28	0.97	0.852
27	1292	323	0.091	0.028	0.01	0.08	0.11	74.91	166.03	0.050	0.082	0.00	0.005	0.006	85	3	0.97	0.250
28	797	255	0.087	0.179	0.01	0.01	0.34	78.62	105.73	0.050	0.080	0.00	0.004	0.005	81	3	0.96	0.320
29	52	59	1.596	0.861	0.16	0.52	0.77	6.43	12.26	0.073	0.127	0.00	0.048	0.059	928	29	0.96	1.129
30	884	229	0.089	0.065	0.01	0.03	0.04	77.16	169.54	0.050	0.091	0.00	0.004	0.006	83	3	0.96	0.259
31	682	321	0.090	0.114	0.01	0.03	0.45	76.28	128.39	0.050	0.085	0.00	0.004	0.007	84	3	0.96	0.471
32	1010	218	0.089	0.058	0.01	0.05	0.55	76.80	147.66	0.049	0.084	0.00	0.005	0.006	83	3	0.96	0.215
33	2110	723	0.087	0.004	0.01	0.06	0.63	79.11	183.41	0.049	0.082	0.00	0.004	0.006	81	3	0.96	0.343
34	730	155	0.087	0.078	0.01	0.01	0.43	78.86	160.74	0.049	0.086	0.00	0.004	0.006	81	3	0.96	0.213
35	780	197	0.092	0.069	0.01	0.01	0.59	75.24	150.89	0.050	0.097	0.00	0.005	0.007	85	3	0.95	0.253
36	910	339	0.727	0.102	0.09	0.58	0.85	11.73	25.51	0.061	0.113	0.00	0.029	0.038	525	17	0.95	0.373
37	581	129	0.096	0.042	0.01	0.02	0.01	73.05	139.28	0.050	0.088	0.00	0.004	0.006	87	3	0.94	0.222
38	516	150	0.111	0.013	0.02	0.05	0.99	64.10	125.32	0.050	0.087	0.00	0.006	0.009	100	11	0.93	0.291
39	409	47	0.439	0.196	0.05	0.42	0.92	18.21	50.34	0.058	0.112	0.00	0.024	0.033	342	13	0.93	0.114
40	305	101	10.830	0.369	0.43	2.73	0.91	2.32	5.28	0.182	0.350	0.00	0.128	0.195	2186	77	0.92	0.331
41	456	59	0.093	0.012	0.01	0.09	0.87	76.98	154.09	0.052	0.082	0.00	0.004	0.006	83	3	0.92	0.128
42	226	89	0.534	0.435	0.06	0.32	0.57	15.63	28.89	0.061	0.099	0.00	0.025	0.032	397	16	0.92	0.392
43	851	85	0.158	0.017	0.02	0.08	0.90	47.13	87.05	0.054	0.090	0.00	0.018	0.024	134	5	0.91	0.100
44	962	218	0.157	0.259	0.02	0.01	0.97	47.66	91.05	0.054	0.088	0.00	0.011	0.015	133	5	0.90	0.227
45	626	351	13.430	#######	0.46	######	0.80	2.17	#VALUE!	0.211	######	0.00	0.123	#VALUE!	2236	82	0.90	0.560
46	375	75	0.184	0.030	0.02	0.08	0.98	41.32	92.09	0.055	0.092	0.00	0.014	0.021	153	10	0.90	0.199
47	534	5	0.849	1.194	0.09	0.13	0.76	11.01	19.70	0.069	0.117	0.00	0.233	0.285	553	17	0.90	0.009
48	416	133	0.225	0.058	0.03	0.17	0.63	34.36	83.59	0.056	0.098	0.00	0.019	0.024	184	11	0.90	0.320
49	275	88	0.277	0.188	0.04	0.13	0.77	28.55	53.60	0.058	0.091	0.00	0.019	0.025	220	9	0.89	0.320
50	1016	233	0.139	0.240	0.02	0.02	0.81	55.13	101.57	0.056	0.090	0.00	0.008	0.011	115	4	0.88	0.229
51	881	203	0.101	0.056	0.01	0.07	0.66	75.29	150.23	0.055	0.092	0.00	0.005	0.007	84	3	0.87	0.230
52	936	43	0.996	0.194	0.10	0.46	0.68	10.06	22.19	0.073	0.132	0.00	0.086	0.115	601	20	0.87	0.046
53	1128	277	0.099	0.074	0.01	0.05	0.50	77.58	175.06	0.056	0.095	0.00	0.005	0.007	82	3	0.86	0.245
54	1130	350	0.101	0.026	0.01	0.11	0.53	75.87	155.86	0.053	0.082	0.00	0.005	0.006	84	3	0.86	0.310
55	971	433	0.099	0.199	0.01	0.01	0.36	77.22	115.49	0.056	0.091	0.00	0.005	0.007	82	3	0.86	0.446
56	840	246	0.103	0.011	0.01	0.09	0.73	75.82	156.93	0.057	0.094	0.00	0.005	0.007	83	3	0.85	0.292
57	856	113	0.611	0.110	0.07	0.27	0.80	15.27	26.83	0.067	0.102	0.00	0.033	0.042	403	17	0.84	0.132
58	42	21	1.170	0.160	0.11	0.53	0.82	9.26	19.52	0.078	0.145	0.00	0.039	0.054	647	95	0.84	0.488
59	486	108	0.232	0.023	0.03	0.18	0.88	35.82	71.37	0.061	0.103	0.00	0.015	0.021	175	6	0.84	0.223
60	260	78	7.014	8.504	0.32	0.59	0.89	3.17	6.26	0.162	0.283	0.00	0.106	0.151	1636	52	0.84	0.298
61	695	228	0.408	0.379	0.05	0.05	0.92	21.71	45.87	0.064	0.115	0.00	0.024	0.033	286	10	0.84	0.328
62	1067	395	0.105	0.201	0.01	0.02	-0.04	75.76	129.96	0.058	0.099	0.00	0.005	0.007	83	3	0.83	0.370
63	130	44	1.660	0.801	0.13	0.28	0.86	7.41	11.45	0.089	0.138	0.00	0.065	0.091	792	25	0.82	0.335
64	756	91	0.160	0.055	0.02	0.10	0.55	51.79	98.78	0.060	0.098	0.00	0.013	0.016	121	5	0.82	0.121
65	1663	363	0.115	0.100	0.01	0.03	0.60	75.47	138.70	0.064	0.094	0.00	0.007	0.009	83	3	0.77	0.218
66	1125	292	0.126	0.193	0.01	0.02	0.24	70.08	141.94	0.064	0.116	0.00	0.007	0.010	89	3	0.76	0.259
67	1217	245	0.144	0.040	0.02	0.06	0.84	63.73	133.94	0.067	0.117	0.00	0.008	0.011	98	6	0.74	0.201
68	2052	347	0.122	0.027	0.01	0.10	0.66	77.76	168.63	0.069	0.126	0.00	0.008	0.010	80	3	0.71	0.169
69	918	271	0.130	0.005	0.01	0.09	0.84	74.13	152.69	0.070	0.118	0.00	0.006	0.008	84	3	0.70	0.295
70	735	206	0.131	0.026	0.01	0.08	0.43	74.85	157.18	0.071	0.114	0.00	0.007	0.009	83	3	0.69	0.280
71	481	104	0.135	0.050	0.01	0.04	-0.02	73.91	126.24	0.073	0.123	0.00	0.008	0.013	84	3	0.68	0.216
72	2790	940	0.131	0.007	0.01	0.10	0.40	76.45	223.74	0.073	0.140	0.00	0.007	0.010	81	3	0.67	0.337
73	397	203	1.614	1.654	0.10	0.09	0.97	9.84	19.49	0.115	0.204	0.00	0.085	0.121	581	23	0.64	0.512
74	802	214	0.187	0.020	0.02	0.13	0.88	57.50	139.86	0.078	0.154	0.00	0.009	0.012	107	4	0.64	0.266
75	785	504	0.167	0.129	0.01	0.05	0.82	67.39	151.54	0.082	0.133	0.00	0.004	0.006	91	3	0.61	0.642
76	1718	588	0.156	0.212	0.01	0.03	0.89	74.79	149.55	0.086	0.137	0.00	0.008	0.010	81	3	0.58	0.342
77	766	190	0.181	0.182	0.01	0.04	0.66	67.98	164.15	0.088	0.144	0.00	0.010	0.014	89	4	0.56	0.248
78	850	333	0.412	0.044	0.03	0.20	0.41	33.75	73.99	0.101	0.184	0.00	0.021	0.031	176	6	0.54	0.392
79	994	366	0.497	0.046	0.03	0.19	0.86	33.06	75.53	0.123	0.225	0.00	0.020	0.026	174	7	0.47	0.368
80	484	336	15.300	0.934	0.22	1.00	1.00	4.52	9.02	0.496	0.804	0.00	0.400	0.726	741	232	0.45	0.695
81	1523	512	0.213	0.550	0.01	0.01	0.80	72.57	120.88	0.113	0.197	0.00	0.011	0.015	81	3	0.45	0.336
82	1302	487	0.236	0.351	0.01	0.02	0.91	68.68	144.35	0.116	0.196	0.00	0.011	0.015	85	3	0.43	0.374
83	447	482	0.686	0.065	0.03	0.15	0.34	28.88	64.76	0.145	0.250	0.00	0.012	0.016	193	7	0.41	1.078
84	767	242	25.000	12.011	0.22	1.51	1.00	4.55	10.02	0.703	1.145	0.00	1.270	1.781	227	177	0.39	0.316

85	781	204	0.292	0.020	0.02	0.08	0.97	66.67	161.78	0.140	0.243	0.00	0.019	0.024	85	3	0.37	0.261
86	1628	495	0.291	0.427	0.01	0.07	0.89	68.31	123.18	0.144	0.230	0.00	0.017	0.022	82	3	0.36	0.304
87	532	97	0.318	0.267	0.02	0.06	0.86	63.57	120.92	0.146	0.251	0.00	0.030	0.040	88	3	0.36	0.182
88	1295	299	0.820	0.928	0.03	0.08	0.98	30.58	57.89	0.177	0.318	0.00	0.046	0.056	174	13	0.34	0.231
89	1004	213	0.416	0.560	0.02	0.01	0.99	56.18	102.65	0.166	0.263	0.00	0.033	0.044	97	6	0.32	0.212
90	769	174	0.810	0.081	0.03	0.10	0.99	35.97	62.28	0.207	0.323	0.00	0.061	0.078	141	9	0.29	0.226
91	1077	406	0.484	0.039	0.02	0.11	0.86	56.56	110.06	0.198	0.308	0.00	0.024	0.035	91	4	0.28	0.377
92	773	304	12.500	3.559	0.12	0.46	1.00	8.47	14.72	0.748	1.190	0.00	0.560	0.721	79	55	0.27	0.393
93	914	266	0.460	0.515	0.02	0.01	1.00	61.35	133.14	0.194	0.389	0.00	0.029	0.044	85	9	0.27	0.291
94	18	48	8.650	10.620	0.09	0.77	0.96	10.85	23.94	0.680	0.995	0.00	0.069	0.080	113	33	0.25	2.755
95	296	280	0.920	0.080	0.02	0.11	1.00	41.67	102.59	0.274	0.558	0.00	0.018	0.026	109	14	0.23	0.948
96	537	295	7.200	9.804	0.08	0.15	0.99	12.66	26.76	0.624	1.174	0.00	0.207	0.253	133	72	0.23	0.549
97	849	233	0.665	0.388	0.02	0.05	0.94	56.02	124.65	0.270	0.494	0.00	0.044	0.063	82	4	0.22	0.274
98	836	404	0.677	0.221	0.02	0.12	0.97	55.43	121.41	0.271	0.462	0.00	0.029	0.040	83	4	0.22	0.483
99	304	118	6.400	2.214	0.07	0.32	1.00	14.08	30.45	0.598	0.944	0.00	0.290	0.355	134	52	0.22	0.389
100	488	149	6.760	1.656	0.07	0.39	1.00	14.08	27.77	0.687	1.145	0.00	0.419	0.542	83	28	0.21	0.304
101	680	313	6.000	2.098	0.07	0.50	1.00	15.15	35.48	0.594	0.995	0.00	0.223	0.289	127	54	0.21	0.460
102	304	224	5.500	1.390	0.06	0.32	1.00	15.87	35.51	0.604	1.159	0.00	0.131	0.171	116	34	0.21	0.737
103	2052	806	1.400	1.476	0.03	0.09	0.98	35.50	62.92	0.354	0.578	0.00	0.063	0.073	110	8	0.20	0.393
104	281	255	4.530	1.895	0.06	0.31	0.99	18.15	36.26	0.597	1.079	0.00	0.093	0.124	105	18	0.20	0.907
105	456	164	0.933	0.207	0.02	0.10	0.97	49.38	103.00	0.332	0.591	0.00	0.048	0.066	83	6	0.19	0.359
106	728	352	1.020	0.261	0.02	0.10	1.00	47.62	89.40	0.351	0.607	0.00	0.039	0.054	82	9	0.19	0.483
107	628	186	2.590	0.378	0.04	0.20	1.00	27.03	58.22	0.502	0.941	0.00	0.157	0.210	99	13	0.18	0.296
108	1450	734	3.480	0.157	0.04	0.24	1.00	23.31	54.33	0.579	1.112	0.00	0.125	0.186	88	17	0.18	0.506
109	995	335	3.600	6.090	0.04	0.06	1.00	23.26	38.52	0.538	0.936	0.00	0.186	0.252	103	34	0.18	0.337
110	849	192	3.450	3.742	0.04	0.17	1.00	23.92	48.82	0.597	0.877	0.00	0.277	0.353	80	13	0.17	0.226
111	772	285	2.030	0.896	0.03	0.76	0.98	32.47	78.14	0.474	0.795	0.00	0.110	0.149	90	9	0.17	0.369
112	583	259	3.010	2.653	0.04	0.08	1.00	25.84	47.88	0.551	0.892	0.00	0.128	0.176	88	18	0.17	0.444
113	369	223	2.380	0.298	0.03	0.18	1.00	29.59	57.78	0.506	0.854	0.00	0.074	0.110	90	12	0.17	0.604
114	551	174	1.480	0.989	0.03	0.10	1.00	39.84	78.48	0.393	0.697	0.00	0.082	0.110	90	18	0.17	0.316
115	1377	384	1.360	0.153	0.02	0.15	0.99	42.37	102.22	0.411	0.826	0.00	0.087	0.127	81	9	0.17	0.279
116	552	102	2.920	0.520	0.04	0.19	1.00	26.81	64.28	0.561	1.032	0.00	0.289	0.382	82	15	0.17	0.184
117	374	123	2.110	0.929	0.03	0.18	1.00	32.57	64.43	0.490	0.882	0.00	0.120	0.158	85	12	0.17	0.329
118	958	290	1.740	1.187	0.03	0.22	1.00	37.45	97.22	0.468	0.769	0.00	0.104	0.143	79	9	0.17	0.303

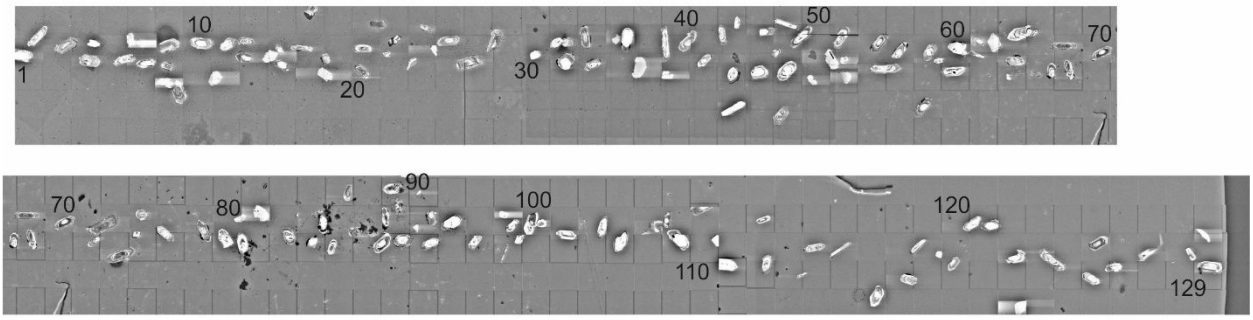
Table S2. UTM coordinates of the sample and photo localities

UTM coordinates of sample and photo localities								
UTM 36 S 04 xx xxx N - 43 xx xxx E								
sample/ photo number	N	E	sample/ photo number	N	E	sample/ photo number	N	E
11152	92 442	90 154	14620	93 253	87 963	15919	91 956	88 873
11164	93 520	87 888	14621	93 241	87 988	15920	91 981	88 900
11167	93 242	87 989	14622	93 234	87 983	15921	91 993	88 901
11168	93 252	87 969	14623	93 220	88 004	15929	94 831	90 371
11169	93 271	87 962	14634	94 063	88 924			
12526	94 270	92 128	14639	93 406	88 938			
12541	94 904	90 793	14640	94 641	88 444			
12543	95 023	90 352	14641	94 678	89 257			
13520	92 839	91 869	14651	94 829	89 377			
13521	92 839	91 869	14671	94 145	90 773			
13522	92 935	91 687	14679	94 307	91 033			
13523	92 961	91 533	14688	94 742	91 620			
13524	92 850	91 377	14713	90 549	86 668			
13534	90 536	88 840	14716	90 520	86 961			
13537	90 952	88 634	14737	89 726	87 279			
13539	91 165	88 702	14798	91 758	86 963			
13539	91 165	88 702	14817	90 842	88 058			
13540	91 238	88 643	14818	90 734	88 019			
13544	92 108	87 603	14819	90 563	88 043			
14580	93 200	38 773	14820	90 594	88 043			
14581	93 200	38 773	14833	91 260	88 476			
14582	93 142	87 772	14835	90 963	88 459			
14584	93 028	87 740	14845	89 905	88 293			
14585	92 997	87 751	14850	90 263	88 511			
14591	92 991	88 425	14855	91 023	90 487			
14592	92 988	88 449	14883	95 075	90 966			
14594	93 035	88 494	14897	92 816	89 574			
14595	93 112	88 564	14899	92 338	88 861			
14595	93 112	88 564	14900	92 245	87 887			
14596	93 112	88 564	15080	92 275	87 964			
14597	93 218	88 620	15083	92 100	88 900			
14598	93 270	88 630	15085	91 980	88 835			
14607	93 321	87 905	15088	91 594	88 687			
14610	93 502	87 435	15090	91 558	89 124			
14611	93 502	87 435	15099	92 078	89 882			
14614	93 262	87 587	15127	90 200	87 600			
14616	93 319	87 899	15129	80 345	87 684			
14617	93 324	87 941	15243	95 755	92 010			
14618	93 319	87 943	15917	92 100	88 683			
14619	93 291	87 967	15918	92 100	88 683			
UTM 36 S 04 xx xxx N - 43 xx xxx E								

Figure S1. Cathodoluminescence images of the zircons

Zircons from the sandstone sample 11169 from the Haymana Formation

Panoramic view



Detailed views

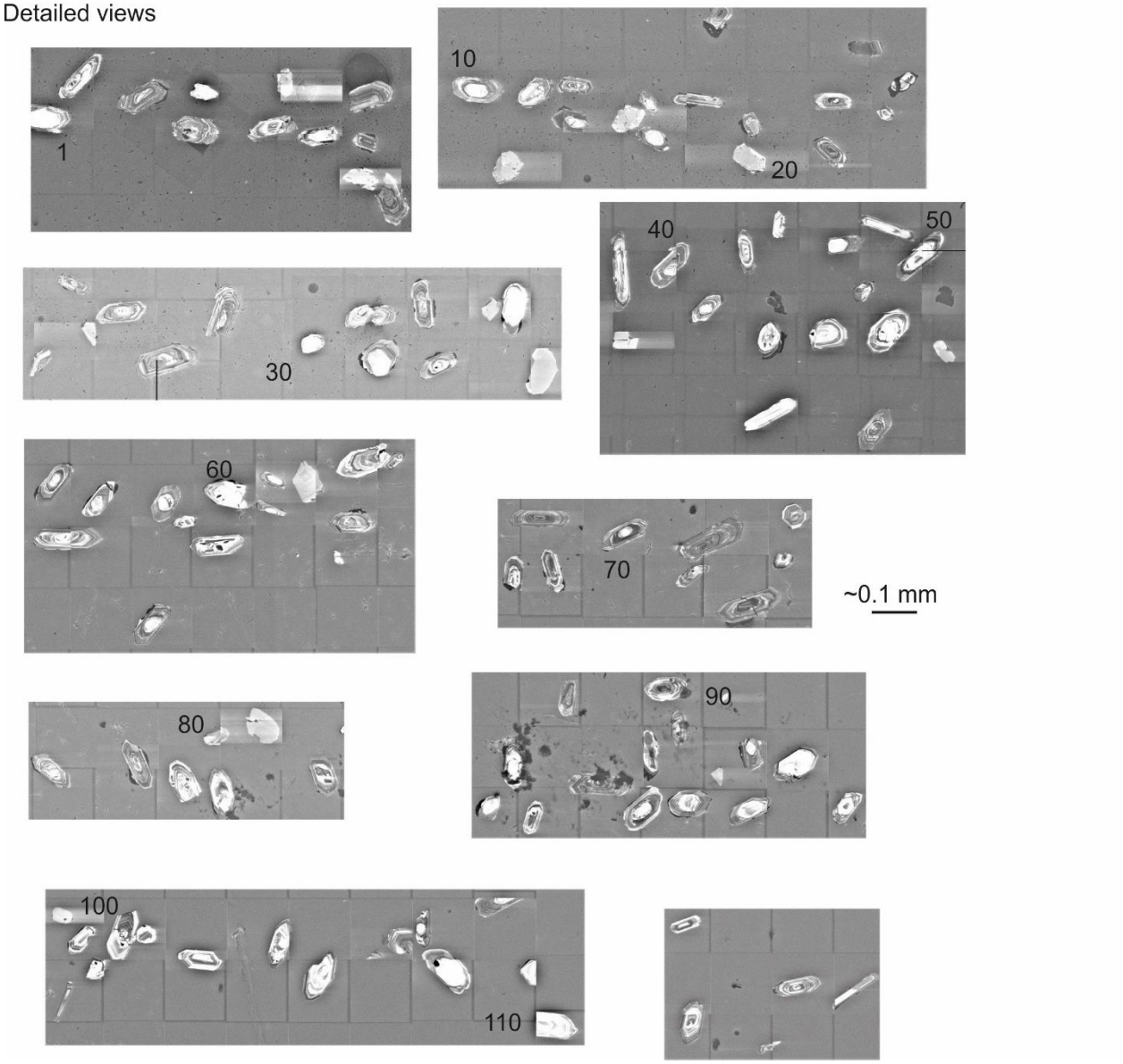
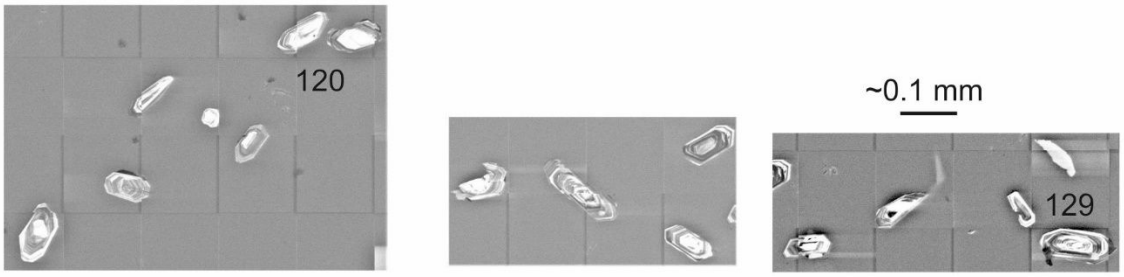
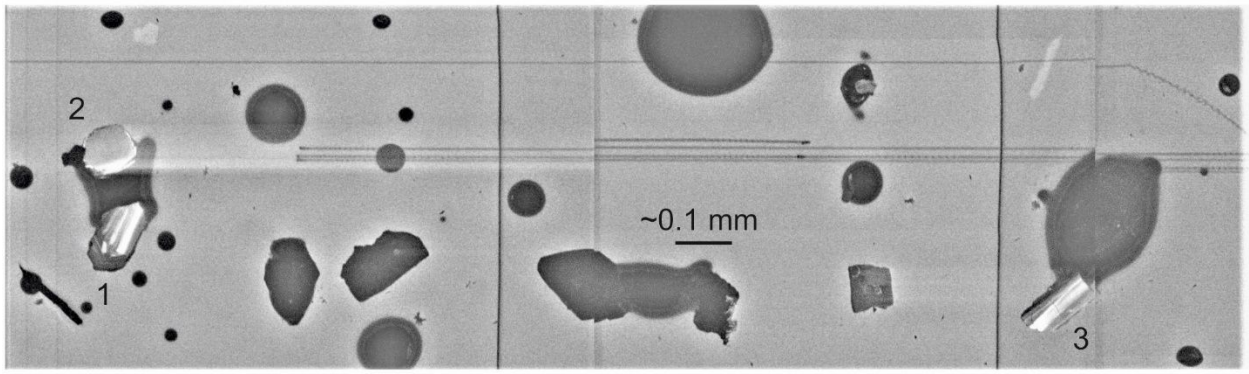


Figure S1. Cathodoluminescence images of the zircons - cont.

Zircons from the sandstone sample 11169 from the Haymana Formation (cont.)



Zircons from the plagiogranite sample 12526 from the Otlubel accretionary-unit



Note. The numbers on the images are for reference only and do not correspond to numbers in Table S1 and 1.

Figure S2

The Figures S2a and S2b illustrate the benthic foraminifera determined from the Eocene sequence in the Beynam (Ankara) area.

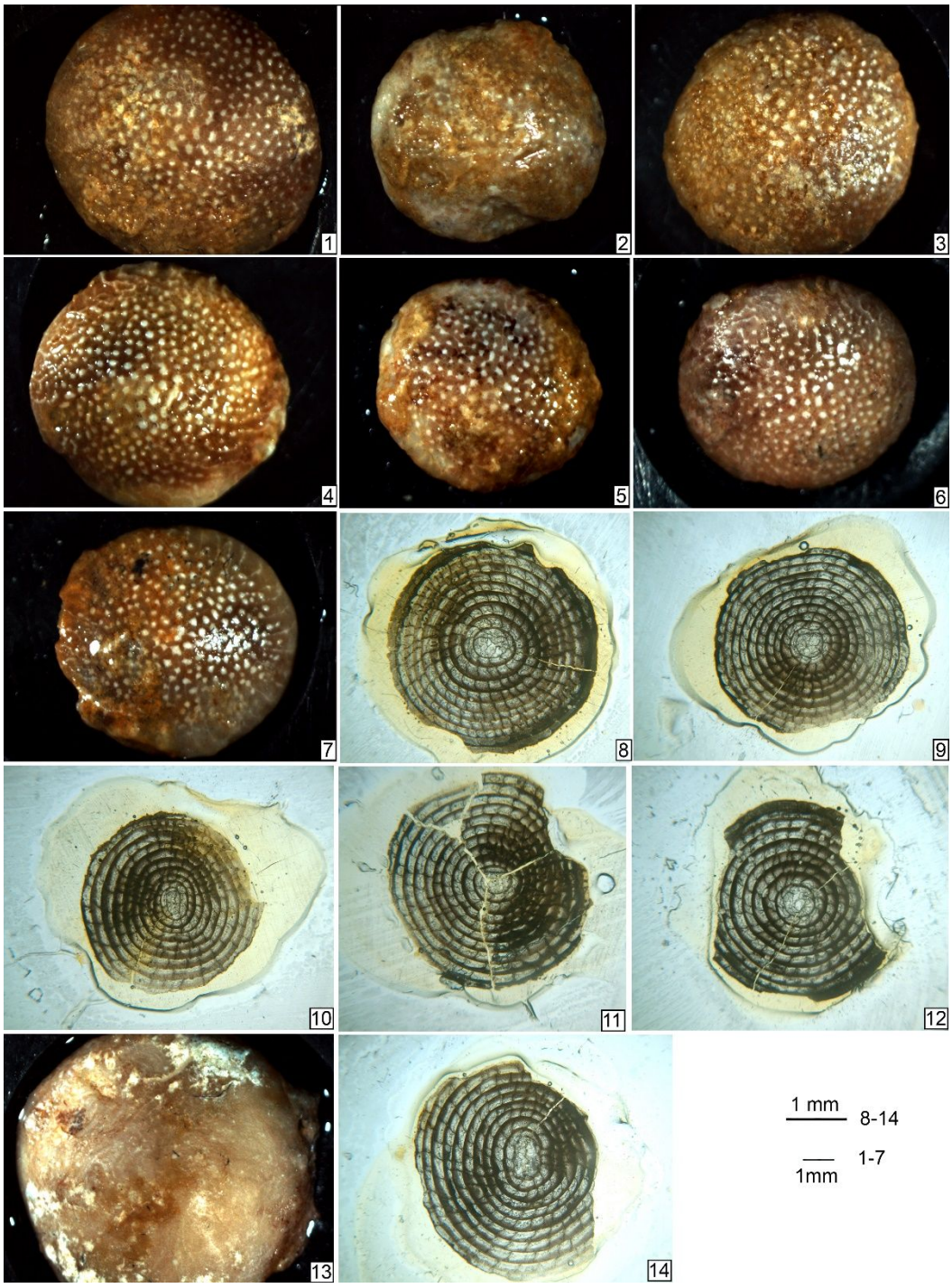


Figure S2a. Large benthic foraminifera in the Eocene sequence in the Beynam (Ankara) region. 1-12; *Nummulites* ex. gr. *perforatus*, 13-14; *Nummulites* sp. Sample 15929.

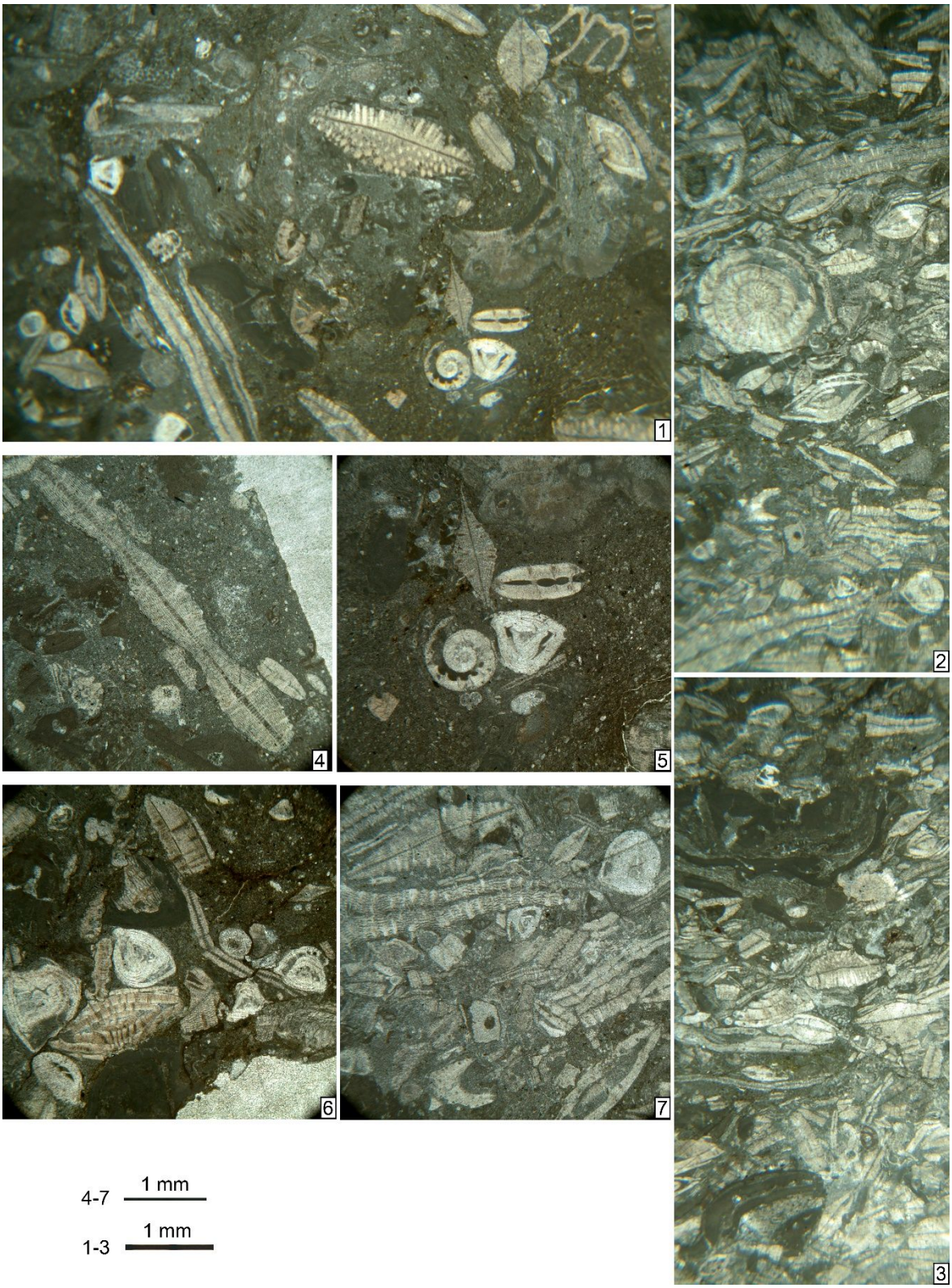


Figure S2b. Large benthic foraminifera in the Eocene sequence in the Beynam (Ankara) region. 1-7; *Asterocyclina alticostata* (Nuttall), *Discocyclina* sp., *Asterocyclina* sp., *Orbitoclypeus* sp., *Asterigerina* sp., *Nummulites* spp., *Assilina* sp. Sample 14885.

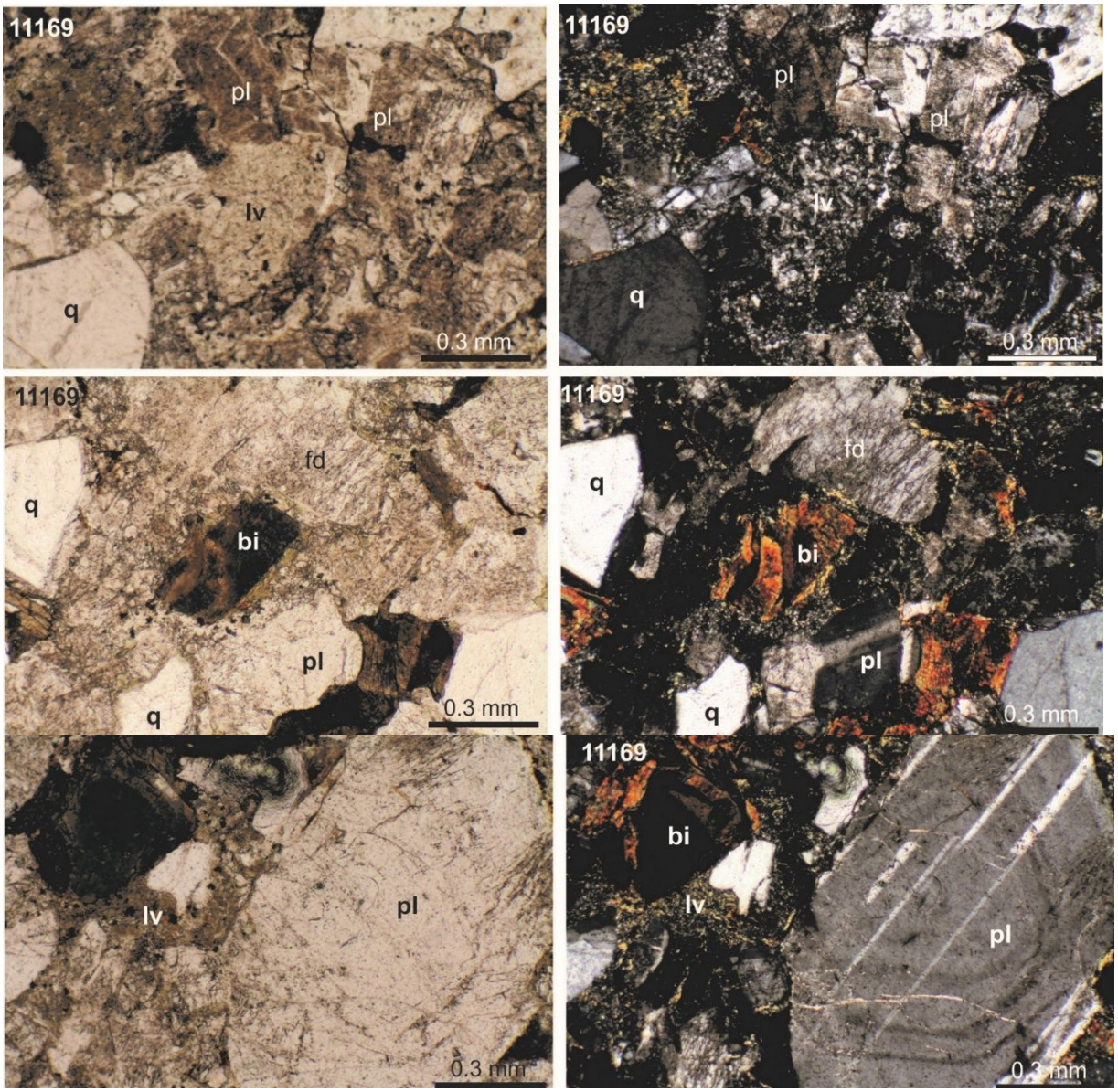
Petrography of the geochemical and geochronological samples

Brief petrographic descriptions of samples analyzed for geochemistry and/or for geochronology are given below, along with their UTM locations and representative microphotos. In the microphotos the left panel gives the view in plane polarized view and the right panel under cross polars.

Abbreviations on the microphotos are: ac, actinolite; an, analcime; au, augite; cc, calcite; chl, chlorite; fd, feldpar; hb, hornblende; kae, kaersutite; lv, volcanic lithic grains; ox, oxy-chlorite; pl, plagioclase; pr, prehnite; q, quartz.

11169 Sandstone – Haymana Formation

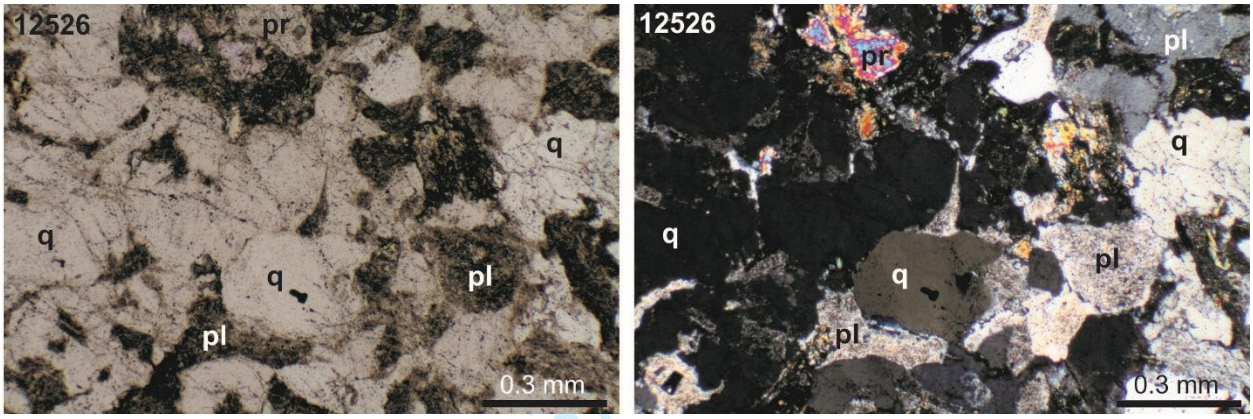
Poorly sorted sandstone with angular to subangular grains of quartz, feldspar, lithic clasts and biotite set on a fine-grained matrix. Feldspar crystals are predominantly plagioclase and commonly show zoning indicating an igneous origin. Lithic grains are fine-grained intermediate volcanic rocks and tuffs. The grain size ranges from 0.2 mm to 2 mm. Matrix is made up mostly of fine-grained lithic grains and comprises about 10% of the rock. Estimated modal amounts feldspar 52%, quartz 23%, lithic grains 12%, biotite 11%, chlorite 2%.



Location UTM 36 S 04 93 271 – 43 87 962 EU1979 datum

12526 Plagiogranite – Otlubel AU

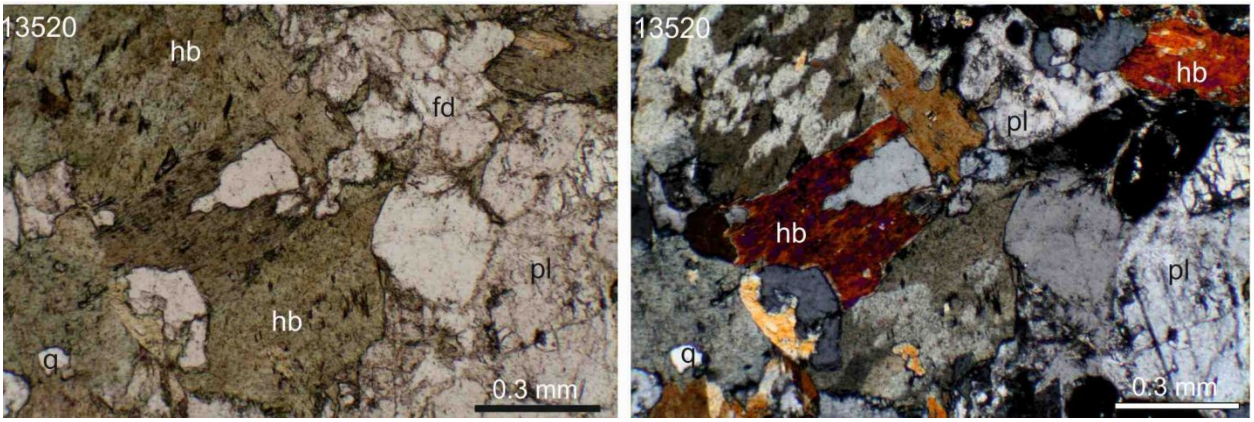
Equigranular, felsic rock composed principally of plagioclase and quartz with secondary chlorite, clinozoisite/epidote and prehnite. Chlorite occurs as pseudomorphs after hornblende, and plagioclase is partly replaced by sericite and prehnite. Grain size is 0.5 - 1 mm. Estimated modal amounts are quartz 54%, plagioclase 33%, opaque mineral 2%, chlorite 5%, clinozoisite/epidote 3%, prehnite 3%.



Location UTM 36 S 04 94 270 – 43 92 128 EU1979 datum

13520 Gabbro – Otlubel AU

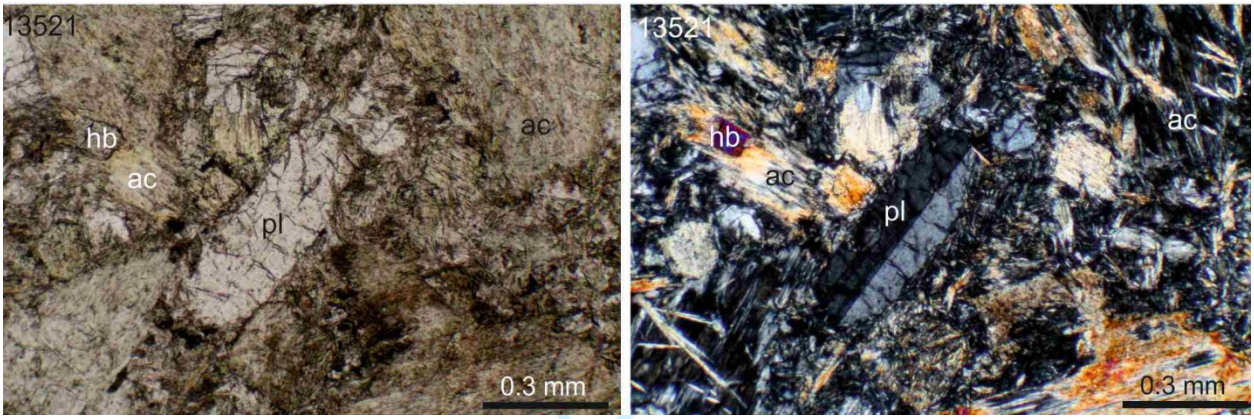
Equigranular, coarse-grained rocks composed mainly of green hornblende and plagioclase with minor orthopyroxene and quartz. Orthopyroxene is rimmed and partially replaced by hornblende. Grain size is 1-2 mm. Estimated modal abundance is hornblende 48%; plagioclase 44%; orthopyroxene 5% and quartz 3%. The rock is fresh but is cut by late stage epidote-pumpellyite veins.



Location UTM 36 S 04 92 839 – 43 91 869 EU1979 datum

13521 Diabase – Otlubel AU

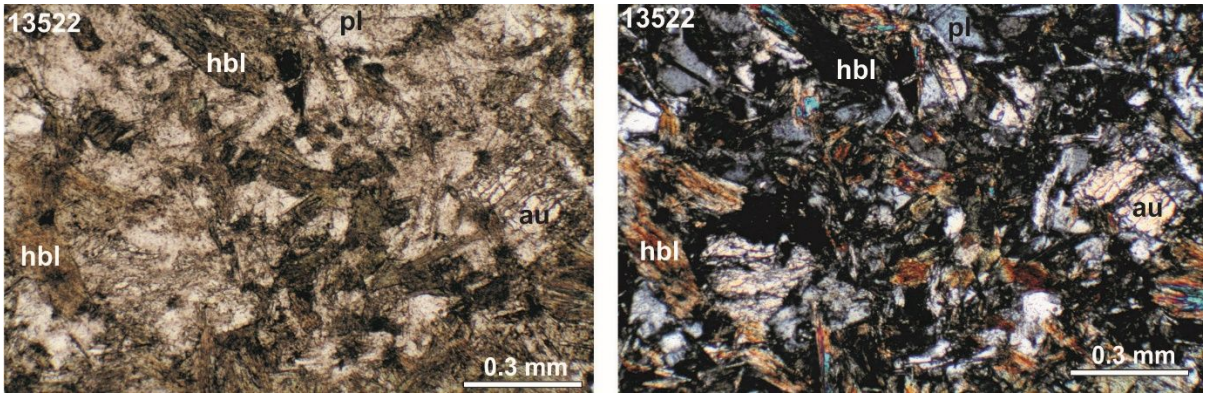
Porphyritic diabase with phenocrystals of plagioclase and hornblende, 1 mm long, set on a finer grained matrix of the same minerals plus opaque mineral. Augite is a rare mineral but occurs both as phenocrysts and in the matrix. Hornblende crystals are commonly replaced by actinolite and chlorite. In the matrix there is abundant secondary colorless actinolite and chlorite. Approximate modal amounts: hornblende and actinolite 49 %, plagioclase 40%, clinopyroxene 2%, opaque mineral 1%, chlorite 8%.



Location UTM 36 S 04 92 839 – 43 91 869 EU1979 datum

13522 Diabase – Otlubel AU

Hornblende, augite and plagioclase make up the bulk of the rock with minor opaque mineral and secondary chlorite. Hornblende occurs as brownish-green crystals showing alteration to colorless actinolite. Augite is also partly replaced by hornblende/actinolite. The grain size in the rock is 0.1 to 0.5 mm. Estimated modal amounts are hornblende 48%, plagioclase 41%, augite 6%, chlorite 3%, opaque mineral 2%.

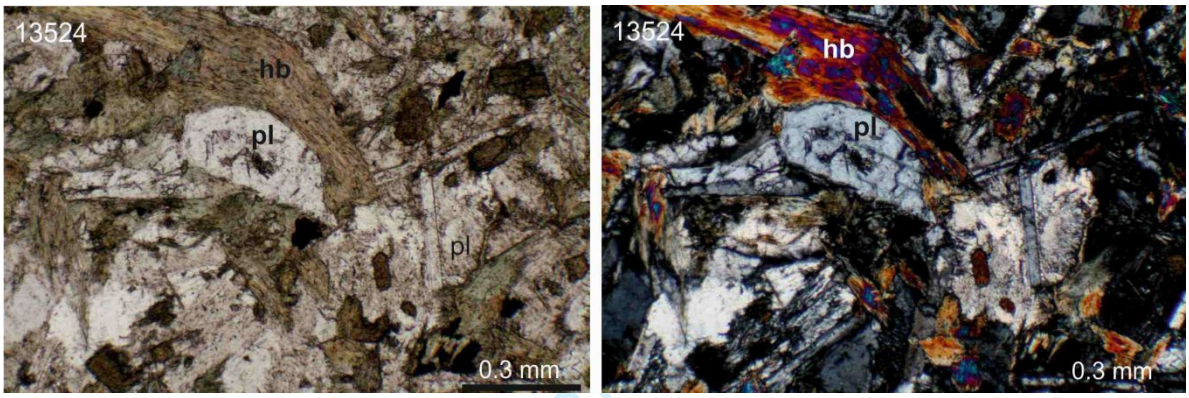


Location UTM 36 S 04 92 935 – 43 91 687 EU1979 datum

13524 Diabase – Otlubel AU

Diabase cut by 1-2 cm thick plagiogranite veins.

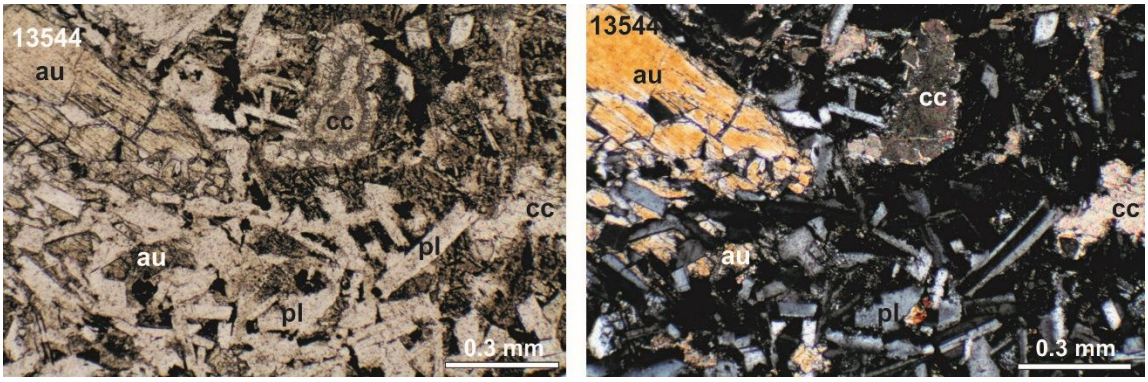
The rock consists predominantly of hornblende and plagioclase with very minor clinopyroxene and opaque mineral. Plagioclase is fresh; chlorite is a secondary mineral, there is also minor secondary actinolite after hornblende. Grain size is 0.2-0.5 mm. Estimated modes are hornblende 49%; plagioclase 45%, clinopyroxene 2%, opaque mineral 1%, chlorite 3%.



Location UTM 36 S 04 92 850 – 43 91 377 EU1979 datum

13544 Porphyritic basalt – Holos AU

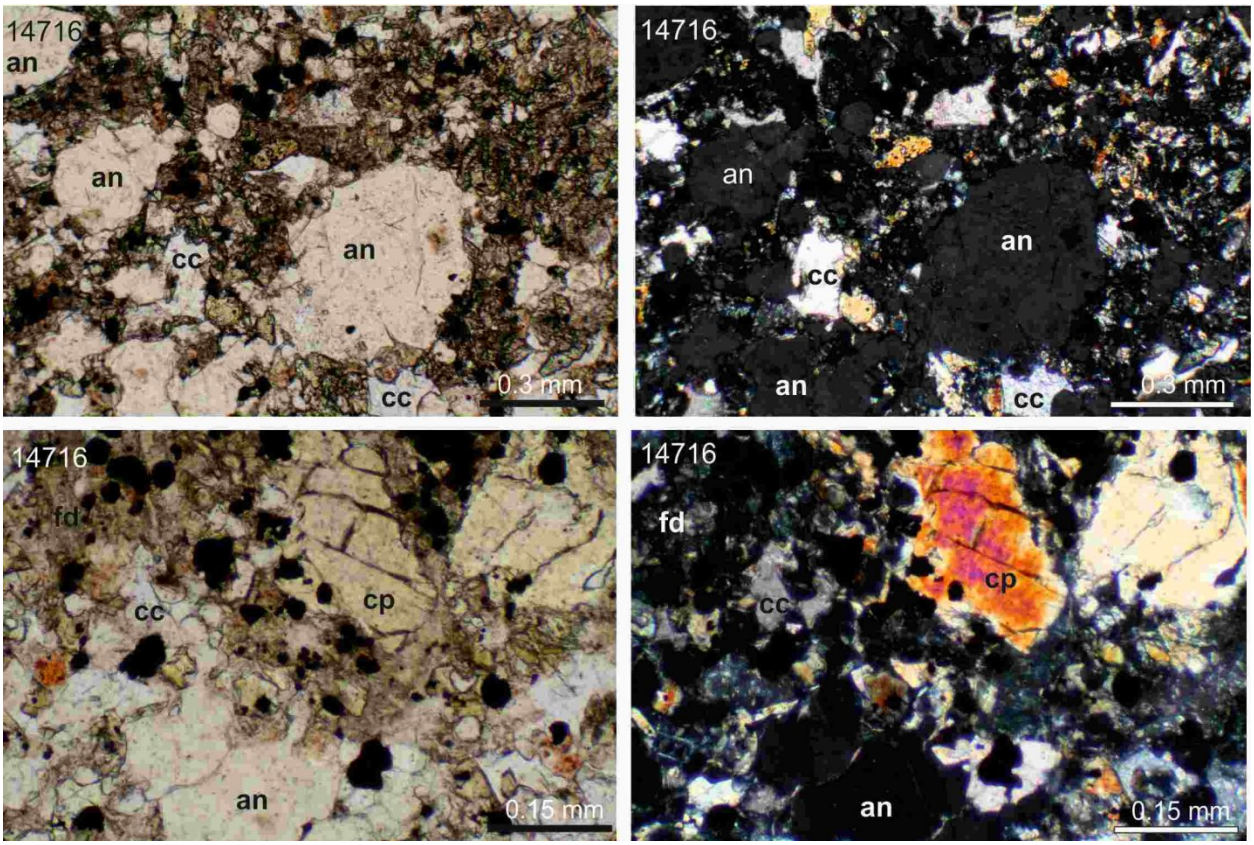
5-7 mm long phenocrysts of plagioclase set on a fine-grained matrix of plagioclase, Ti-augite and opaque minerals. The grain size in the matrix is 0.1-0.2 mm. Pale pink Ti-augite occurs as equant grains in the matrix and also as rare phenocrysts. Secondary minerals are chlorite, calcite and pale green pumpellyite. The amygdales are filled by calcite, which has also replaced some of the plagioclase phenocrysts. The estimated modal amounts are plagioclase 46%, augite 25%, opaque mineral 9%, chlorite 11%, calcite 5%, pumpellyite 4%.



Location UTM 36 S 04 92 108 – 43 87 603 EU1979 datum

14716 Analcime-basalt – Holos AU

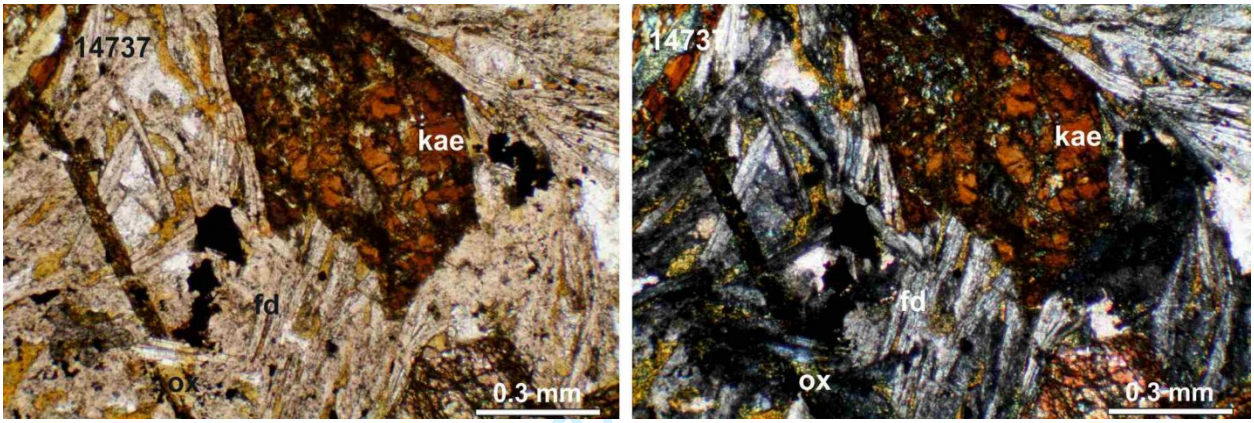
Microphenocrysts of analcime, 0.5 mm across, set on a fine-grained groundmass of analcime, altered feldspar, clinopyroxene and opaque mineral. Clinopyroxene forms pale yellowish green crystals and also occurs as rare phenocrysts, up to 1 mm long. Calcite is secondary mineral. Estimated modal abundance is analcime 40%; clinopyroxene 22%; feldspar 16%; opaque mineral 15%; calcite 7%.



Location UTM 36 S 04 90 520 – 43 86 961 EU1979 datum

14737 Kaersutite-basalt – Holos AU

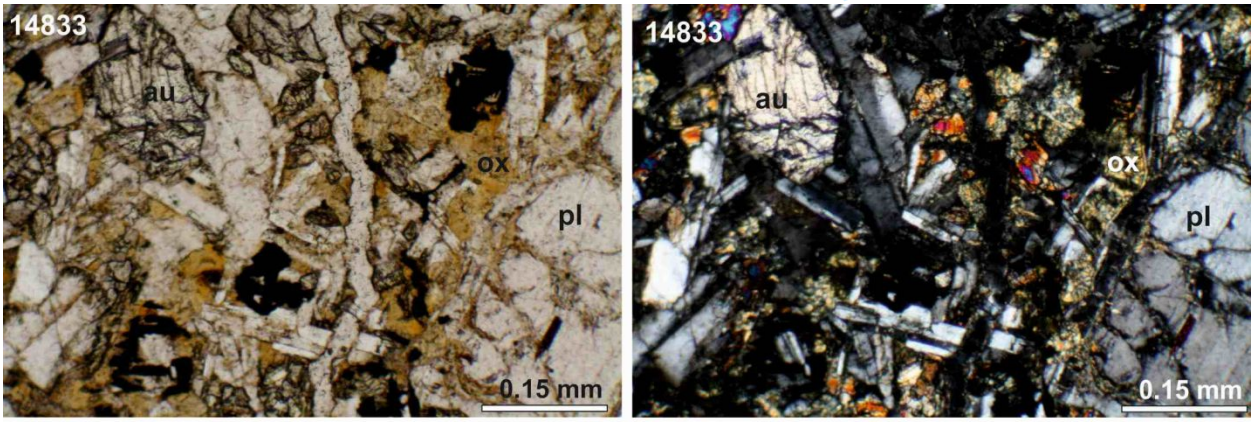
Reddish brown phenocrystals of kaersutite (Ti-amphibole), set on a matrix of slender crystals of feldspar, opaque mineral and secondary yellowish brown oxy-chlorite. Kaersutite phenocrysts occur both as basal sections and as slender crystals, up to 5 mm long. Calcite is a common secondary mineral. Estimated modes are kaersutite 39%, feldspar 39%, opaque mineral 9%, oxy-chlorite 9%, calcite 4%.



Location UTM 36 S 04 89 726 – 43 87 279 EU1979 datum

14833 Porphyritic basalt – Holos AU

Centimeter-long phenocrysts of plagioclase set on a matrix of augite, plagioclase, opaque mineral and secondary oxy-chlorite. Widespread oxy-chlorite has replaced volcanic glass and has partially replaced plagioclase. Grain size in the matrix is 0.1-0.2 mm. Estimated modal amounts plagioclase 55%, augite 25%, opaque mineral 5%, oxy-chlorite 15%

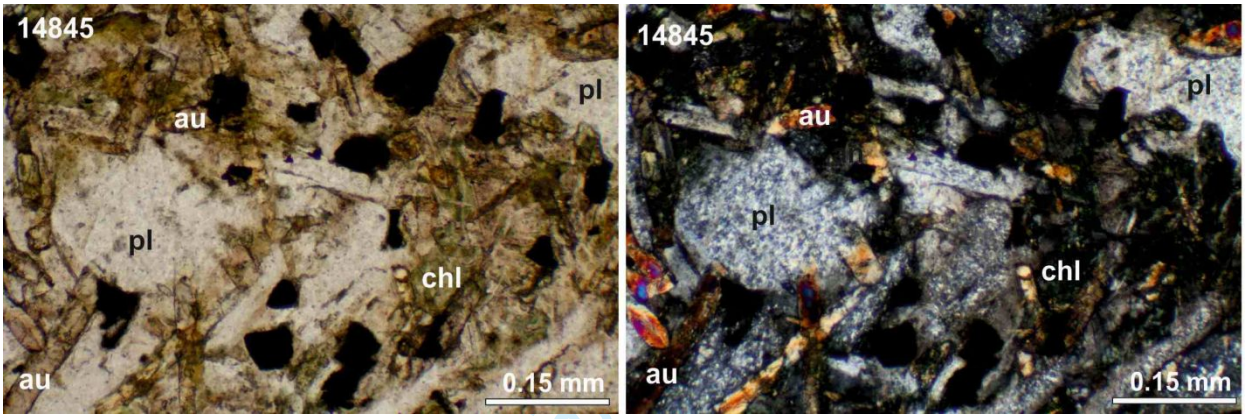


Location UTM 36 S 04 91 260 – 43 88 476 EU1979 datum

14845 Basalt – Kuyumcudağ AU

Basalt block in serpentinite.

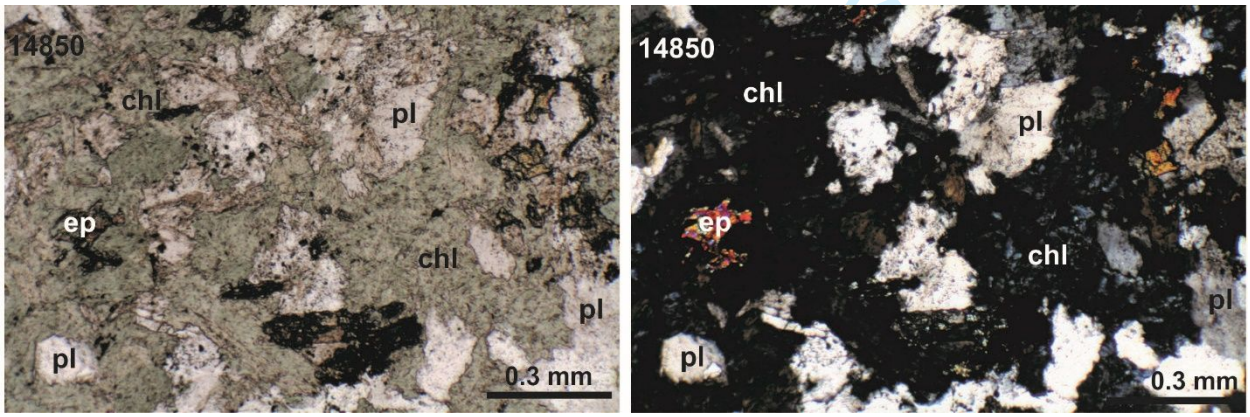
Aphyric amygdoidal basalt composed of plagioclase, augite and opaque mineral with secondary chlorite. Amygdales are filled by calcite with thin rims of oxy-chlorite and pumpellyite. Average grains size is 0.05-0.2 mm. Estimated modal amounts, excluding Amygdales, are plagioclase 41%, augite 35%, opaque mineral 9%, chlorite 15%. Amygdales make up about 4% of the sample.



Location UTM 36 S 04 89 905 – 43 88 293 EU1979 datum

14850 Diabase – Otlubel AU

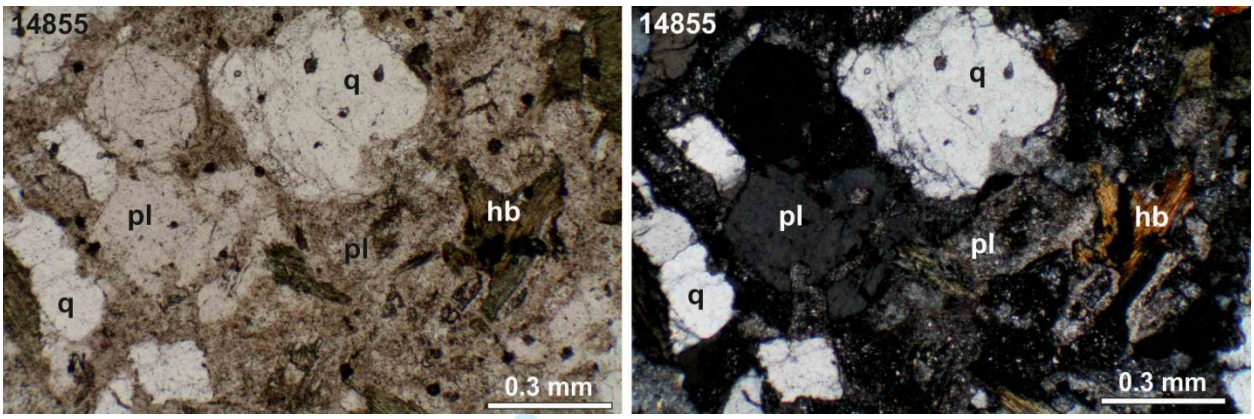
The rock is composed mainly of chlorite and plagioclase (albite) with minor opaque mineral and epidote. The original hornblende is completely replaced by chlorite. Opaque mineral is altering to reddish brown goethite. The average grain size 0.2 mm. Estimated modes are chlorite 47%, plagioclase 38%, opaque mineral 12%, epidote 3%.



Location UTM 36 S 04 90 263 – 43 88 511 EU1979 datum

14855 Plagiogranite – Otlubel AU

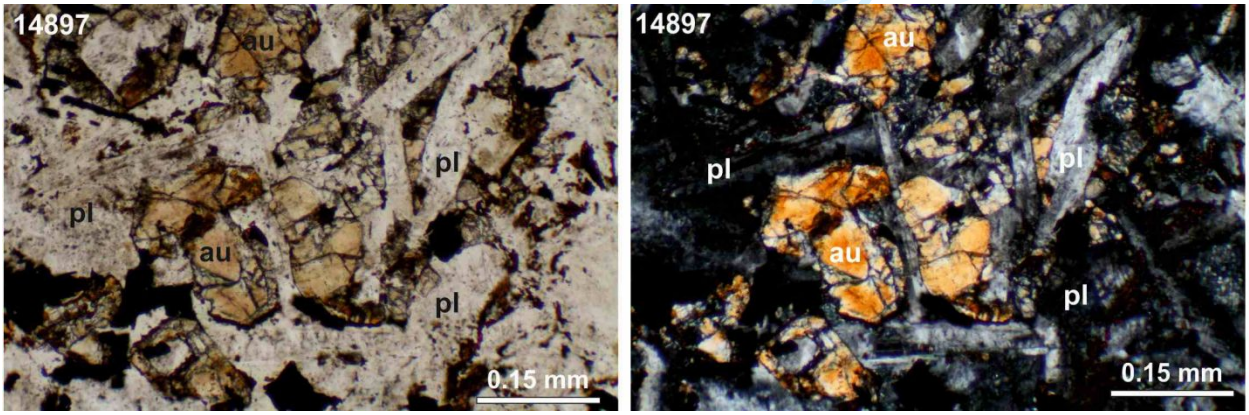
Equigranular rock composed of feldpar, quartz and green hornblende with accessory opaque mineral. Estimated modal abundance is feldspar 47%; quartz 30%; hornblende 20%, opaque mineral 1%, titanite 2%. The average grain size is 0.4 mm. Feldspar is sericitised and opaque mineral is rimmed by late titanite.



Location UTM 36 S 04 91 023 – 43 90 487 EU1979 datum

14897 Basalt – Holos AU

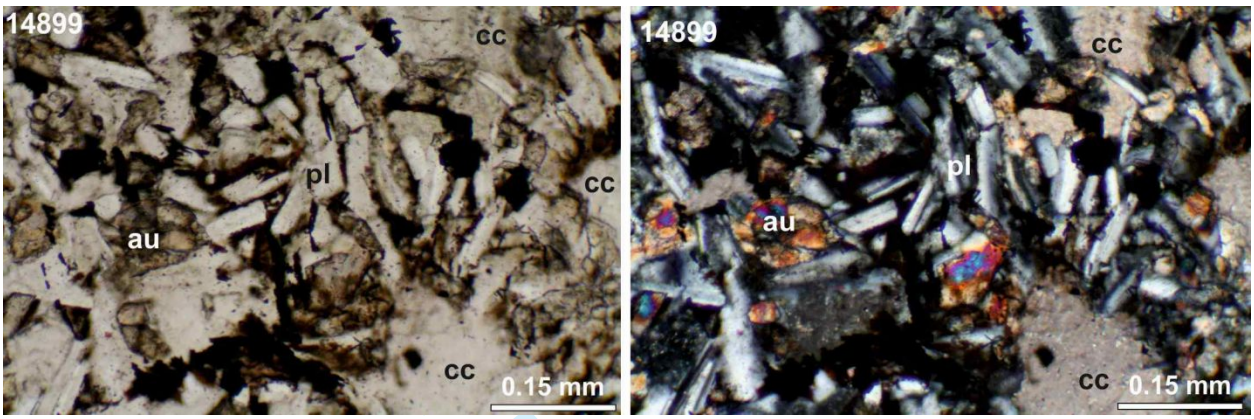
Aphyric amygdoidal basalt consisting of plagioclase, Ti-augite and opaque. Ti-augite forms brownish pink crystals, 0.1-0.4 mm across. Plagioclase shows minor sericitization. Calcite is a secondary mineral and occurs both in the matrix and in the amygdales. Estimated modes, excluding amygdales, are plagioclase 55%, Ti-augite 30%, opaque mineral 10%, calcite 5 %. Amygdales make up about 2% of the sample.



Location UTM 36 S 04 92 816 – 43 89 574 EU1979 datum

14899 Porphyritic basalt – Holos AU

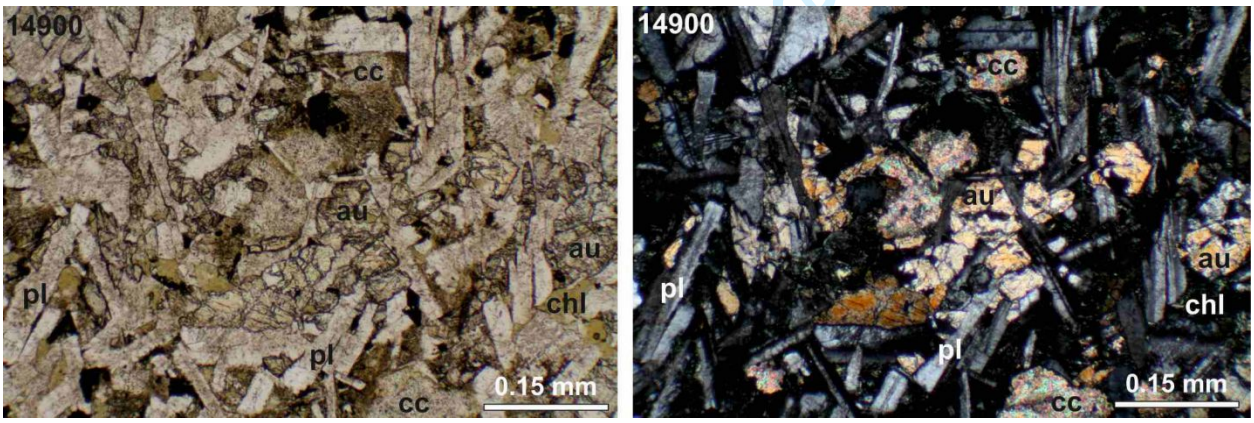
Plagioclase phenocrysts, up to 5 mm long, are set on a fine-grained matrix of plagioclase, pale pink augite and opaque mineral. Calcite is a common secondary mineral and occurs in the matrix and also has partially replaced plagioclase phenocrysts. The grain size in the matrix is 0.1 mm. The estimated modes are plagioclase 49%, augite 27%, opaque mineral 8%, calcite 16%.



Location UTM 36 S 04 92 338 – 43 88 861 EU1979 datum

14900 Basalt – Holos AU

Plagioclase phenocrystals, up to 4 mm across, set on a matrix of plagioclase, augite and opaque mineral with chlorite and calcite as common secondary minerals. Chlorite has replaced the volcanic glass and part of the plagioclase phenocrysts. The grain size in the matrix is 0.2-0.3 mm. Estimated modes are plagioclase 51%, augite 29, opaque 6%, chlorite 10%, calcite 4%.



Location UTM 36 S 04 92 245 – 43 87 887 EU1979 datum