The age of the Sääksjärvi impact structure (Finland): reconciling the timing of small impacts in crystalline basement with that of regional basin development

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Supplementary data

- **Supplementary Table 1** (Data used to produce map in Fig. 1 in main text)
- **Supplementary Figure 1** (Imaging of grain n1049_IMP-1_z4)
- **Supplementary Figure 2** (Imaging of grain n1049_IMP-1_z7)
- **Supplementary Figure 3** (Imaging and EBSD analysis of grain n1050_IMP-11b_z16)
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- **Supplementary Figure 5** (Imaging and EBSD analysis of grain n1050_IMP-11b_z14)
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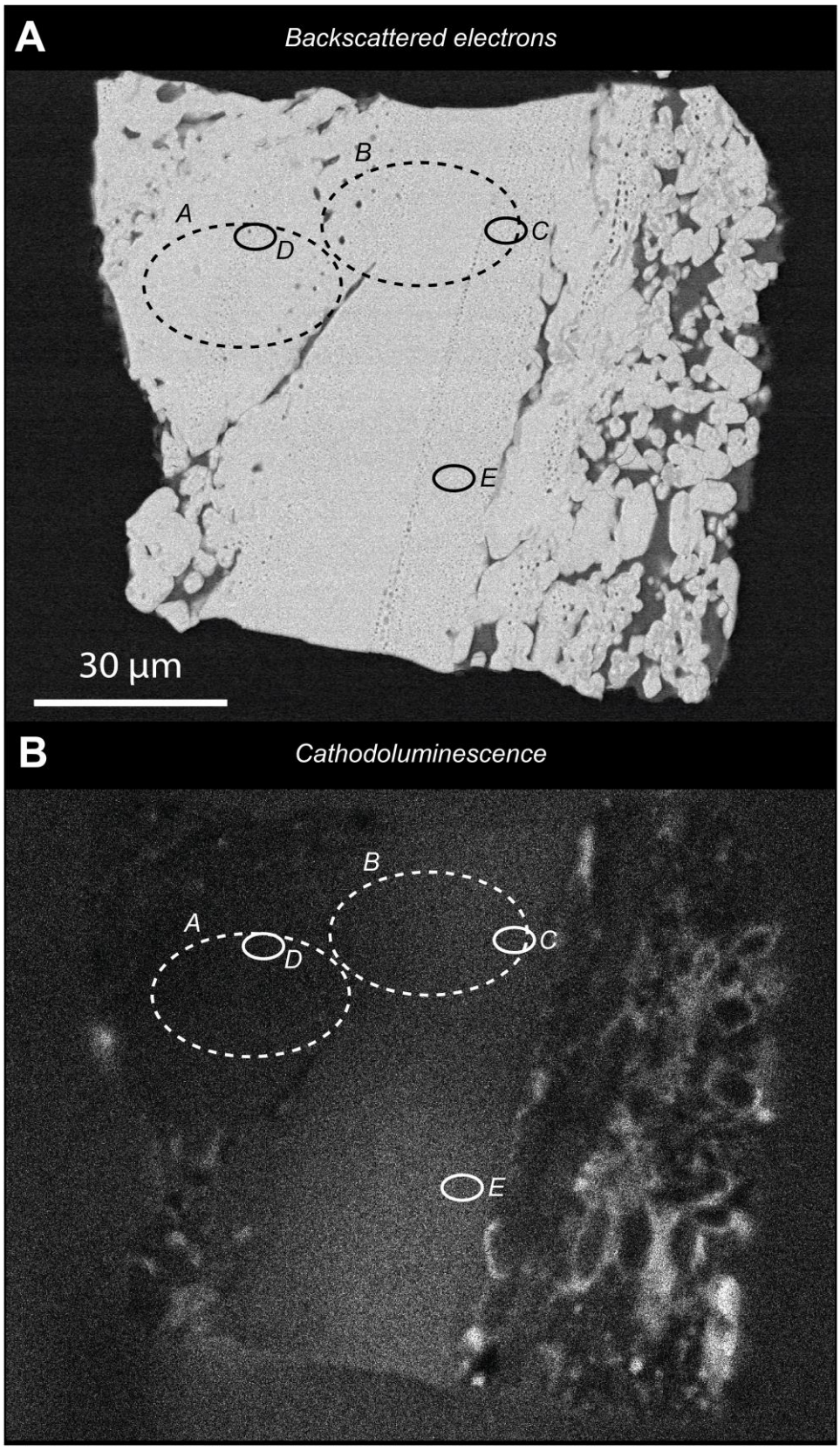
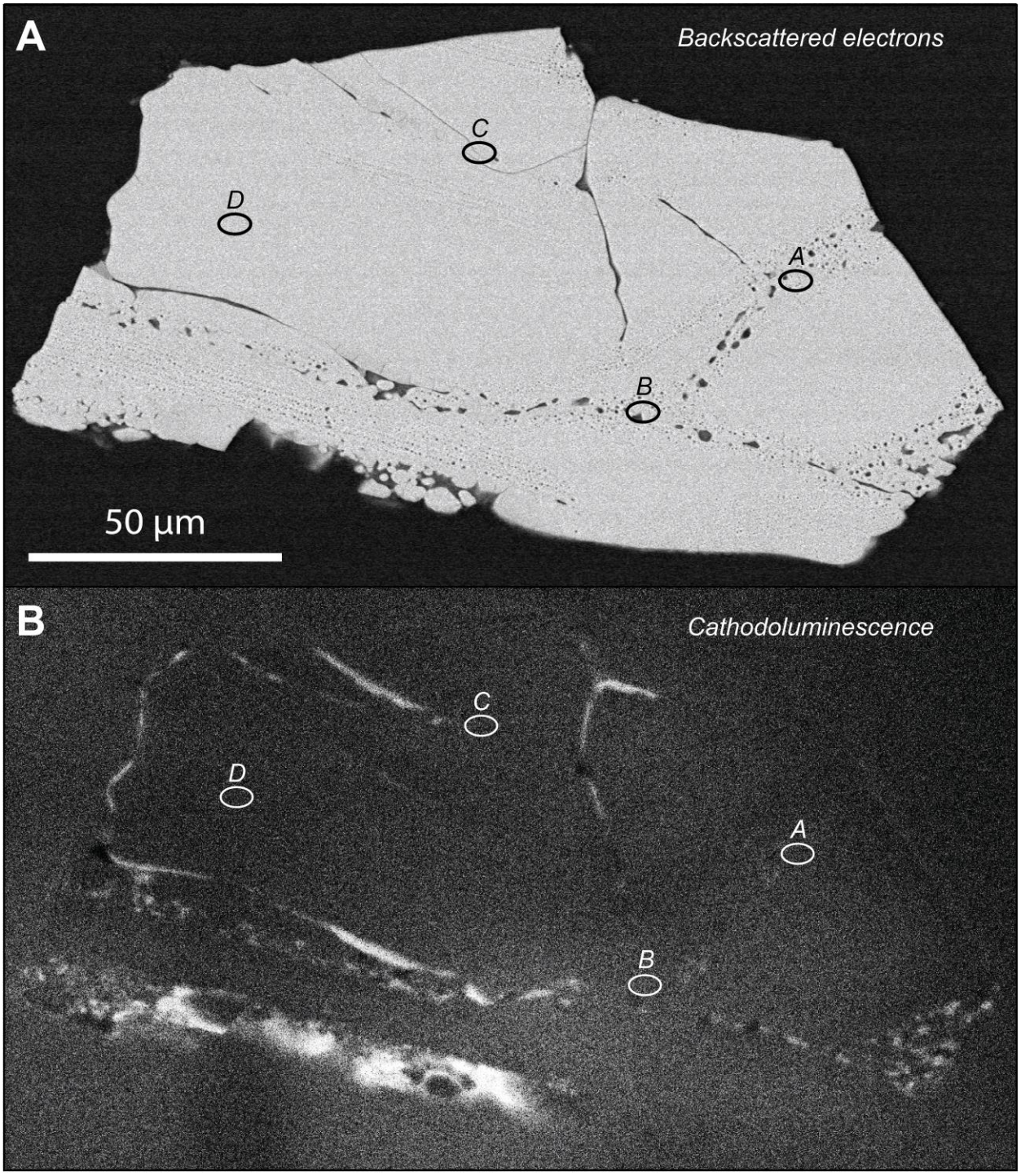
- **Supplementary Figure 7** (Concordia diagram with regression through sub-population)
- **Supplementary Figure 8** (Concordia diagram coloured according to zircon texture)

Name	Longitude	Latitude	Country	Size (km)	Age (Ma)	Target rock	Notes
Dellen	16.70	61.86	Sweden	19	141	Crystalline	
Gardnos	09.00	60.65	Norway	5	546	Crystalline	The U–Pb data for Gardnos are considered equivocal.
Granby	14.93	58.42	Sweden	3	466	Sedimentary	
Hummeln	16.25	57.37	Sweden	1.2	465	Mixed	
Iso-Naakkima	27.15	62.18	Finland	3	1050	Sedimentary	Age range: 1200-900 Ma
Jänisjärvi	30.92	61.97	Russia	14	687	Crystalline	
Kaali	22.67	58.40	Estonia	0.11	0.00324	Sedimentary	Impact into unconsolidated material
Kärdla	22.77	59.02	Estonia	4	455	Mixed	
Karikkoselkä	25.25	62.22	Finland	1.5		Crystalline	Age range 260-230 Ma, or 9 Ma
Keurusselkä	24.60	62.13	Finland	30	1151	Crystalline	
Lappajärvi	23.67	63.15	Finland	23	78	Mixed	
Lockne	14.82	63.00	Sweden	10.75	455	Mixed	Diameter range: 7.5-14km
Lumparn	20.13	60.15	Finland	9		Mixed	Age < 458 Ma
Målingen	14.55	62.92	Sweden	0.7	455	Mixed	
Mien	14.86	56.42	Sweden	9	122	Crystalline	
Neugrund	23.67	59.33	Estonia	20	535	Crystalline	Age range: 540-530 Ma
Paasselkä	29.08	62.03	Finland	10	231	Mixed	
Ritland	06.44	59.23	Norway	2.7	520	Mixed	Age range: 540-500 Ma
Sääksjärvi	22.40	61.40	Finland	6	608	Crystalline	
Saarijärvi	28.38	65.28	Finland	1.5	560	Crystalline	Age range: 600-520 Ma
Siljan	14.87	61.03	Sweden	52	381	Mixed	
Söderfjärden	21.58	63.03	Finland	6.6		Crystalline	Age range: 1880-640 Ma
Summanen	25.38	62.65	Finland	2.6		Crystalline	Age < 1880 Ma
Suvasvesi N	28.17	62.70	Finland	3.5	85	Crystalline	
Suvasvesi S	28.22	62.60	Finland	3.8		Crystalline	Age range: 1880-710 Ma
Tvären	17.42	58.77	Sweden	2	458	Mixed	
Within bounds of map but not considered							
Dobele	23.25	56.58	Latvia				
Ilumetsä	27.42	57.97	Estonia				
Mishina Gora	28.05	58.72	Russia				
Vepriai	24.58	55.08	Lithuania				

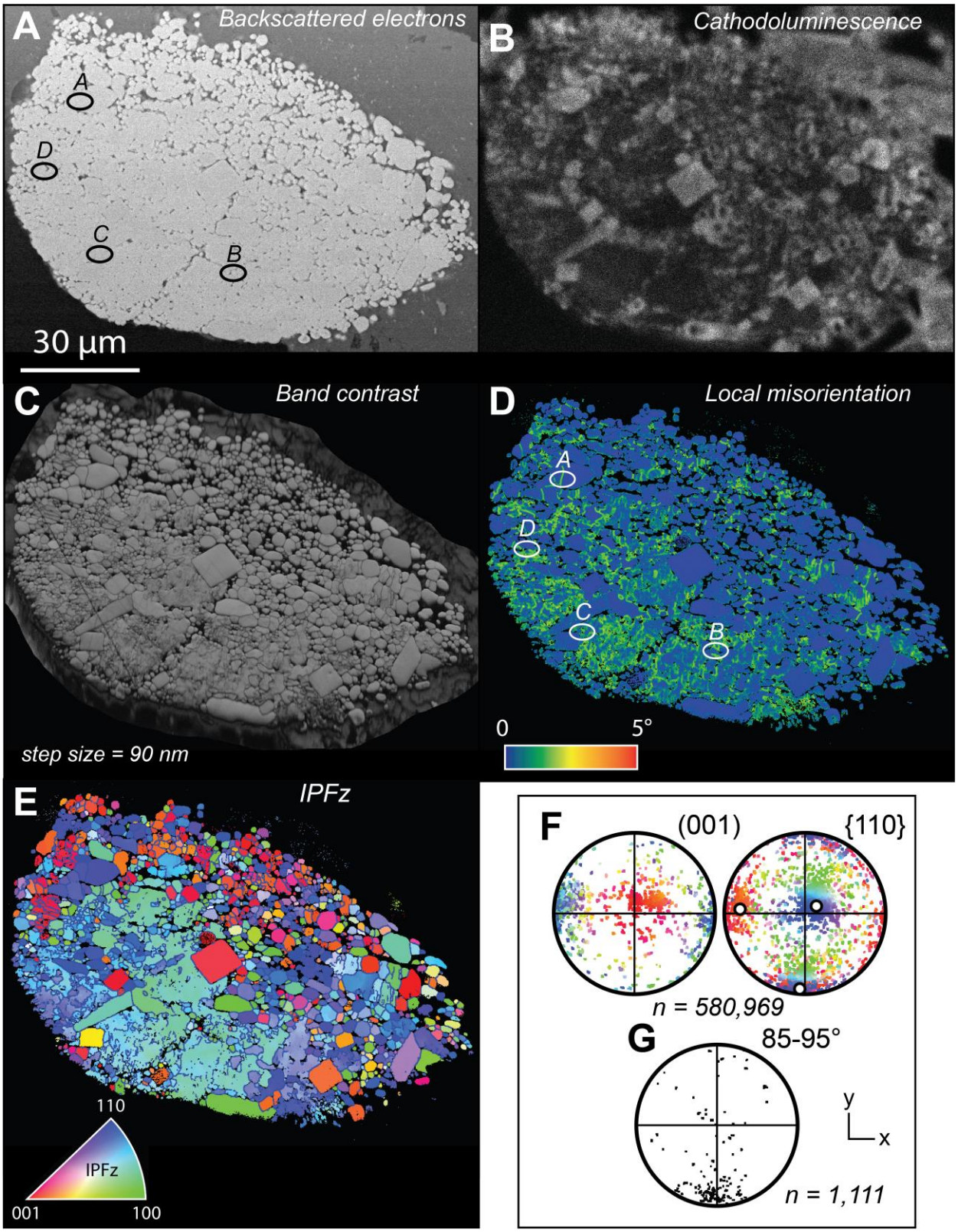
Supplementary Table 1. Data used to produce map in Fig. 1 in main text. Data from Schmieder and Kring (2020), except age for the Sääksjärvi impact structure which is from this study.



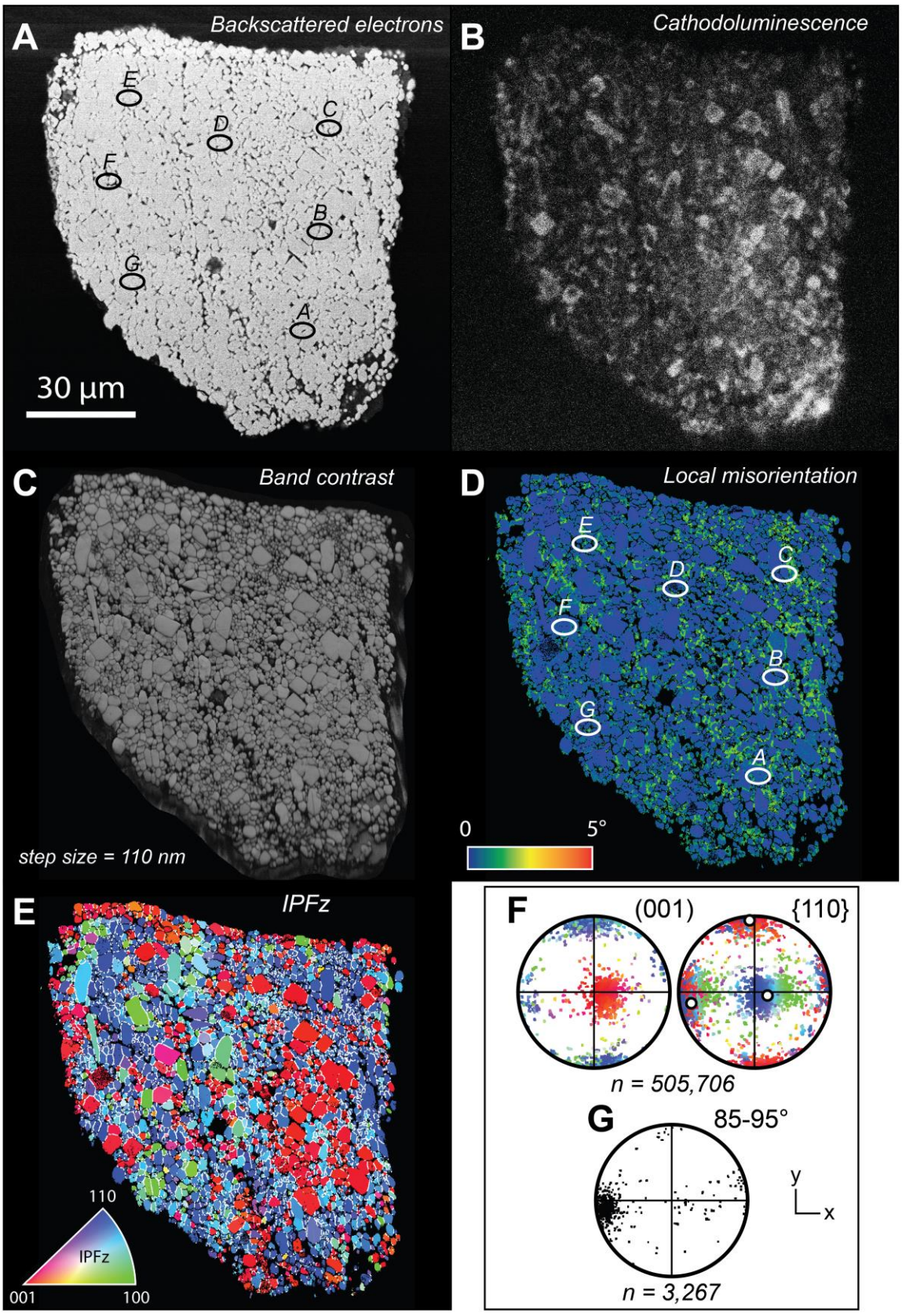
Supplementary Figure 1. Imaging of grain n1049_IMP-1_z4.



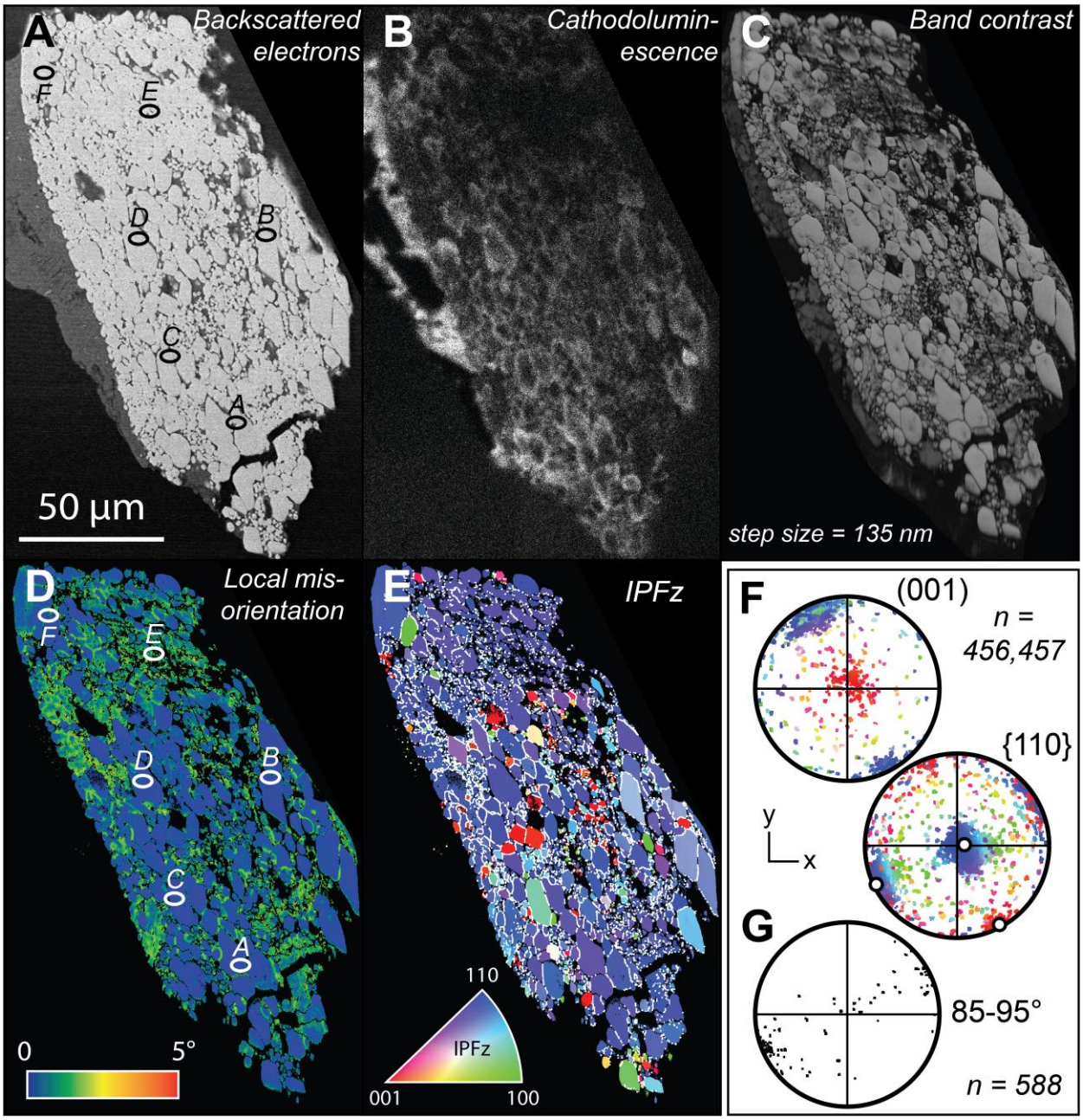
Supplementary Figure 2. Imaging of grain n1049_IMP-1_z7.



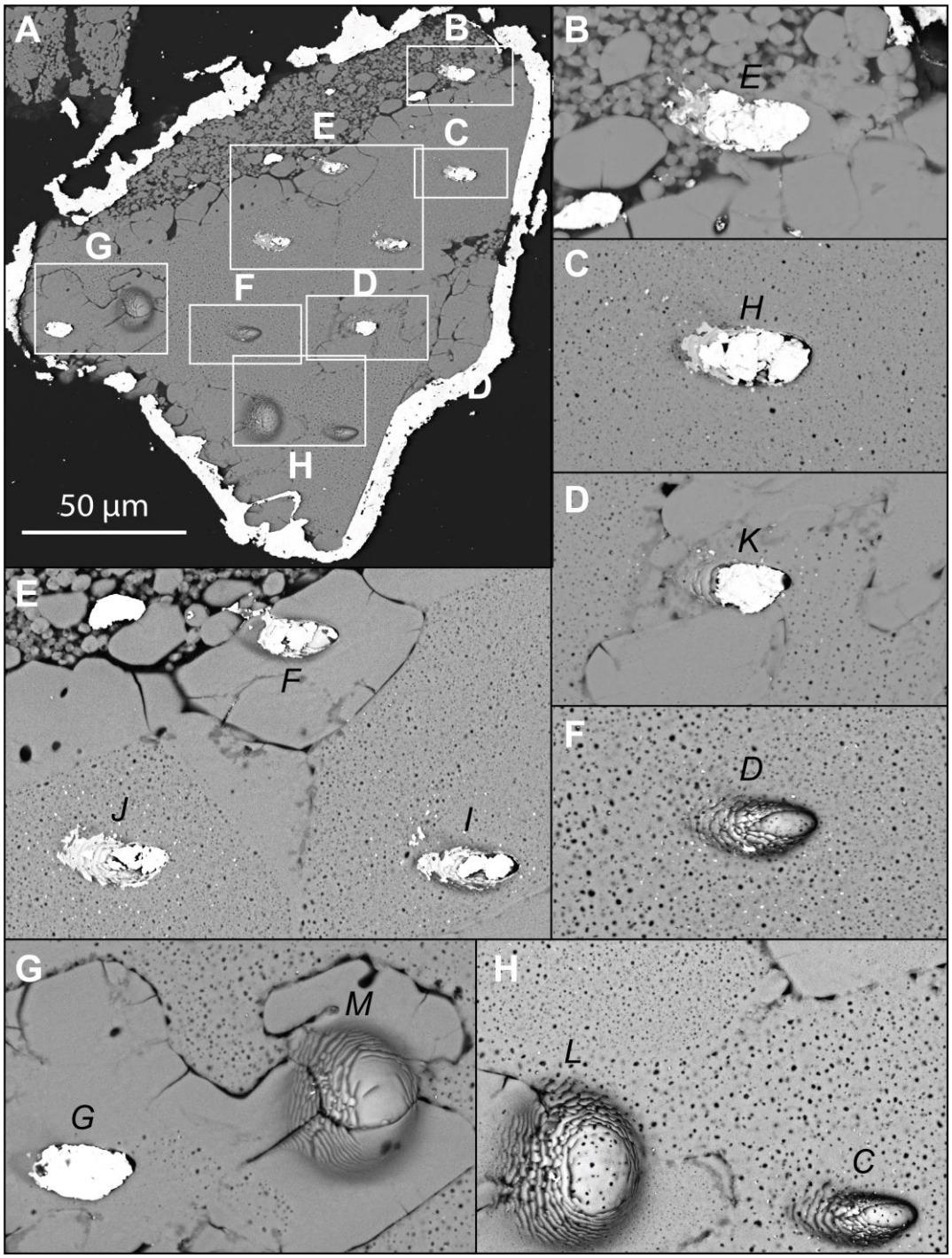
Supplementary Figure 3. Imaging and EBSD analysis of grain n1050_IMP-11b_z16.



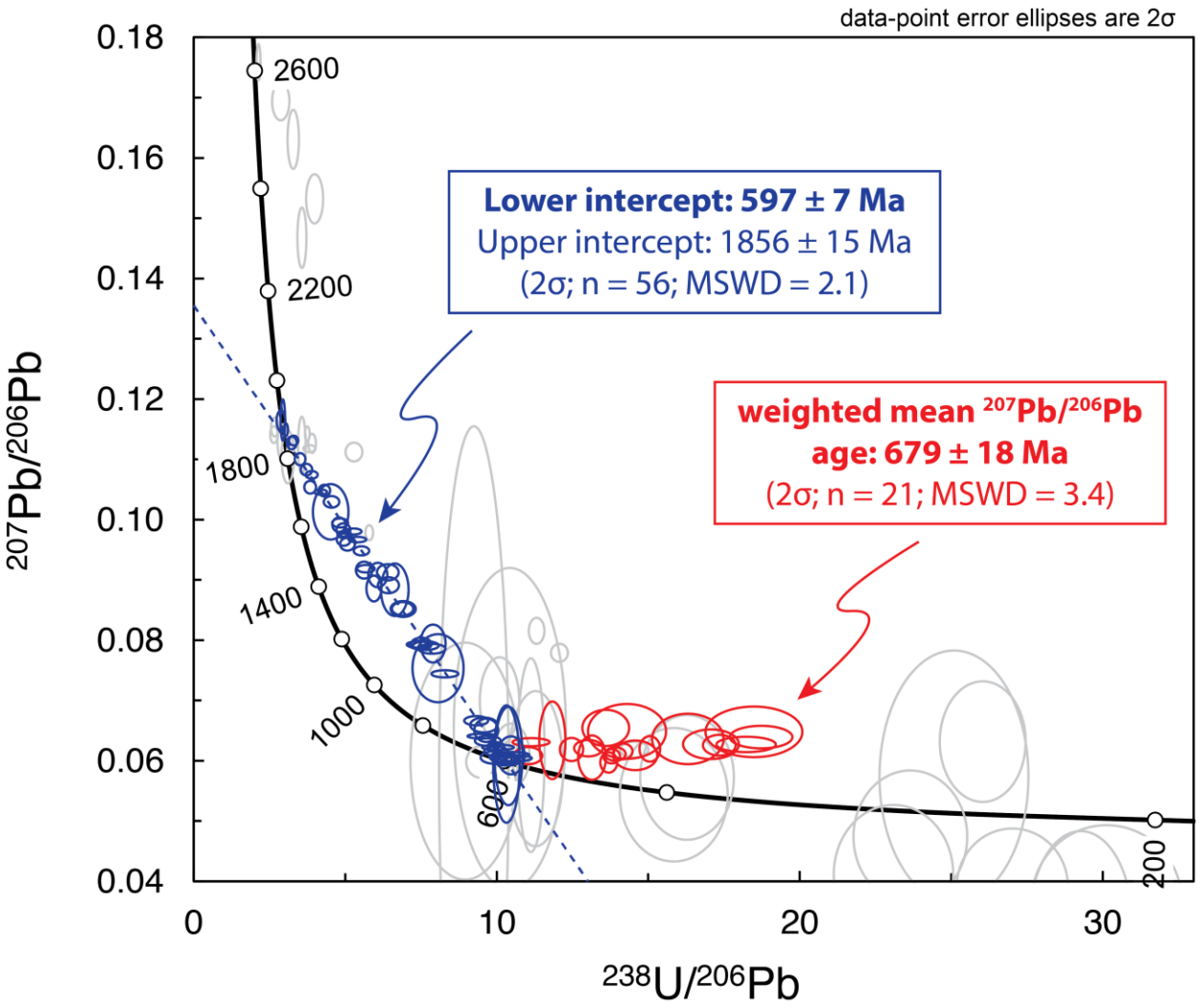
Supplementary Figure 4. Imaging and EBSD analysis of grain n1050_IMP-11b_z18.



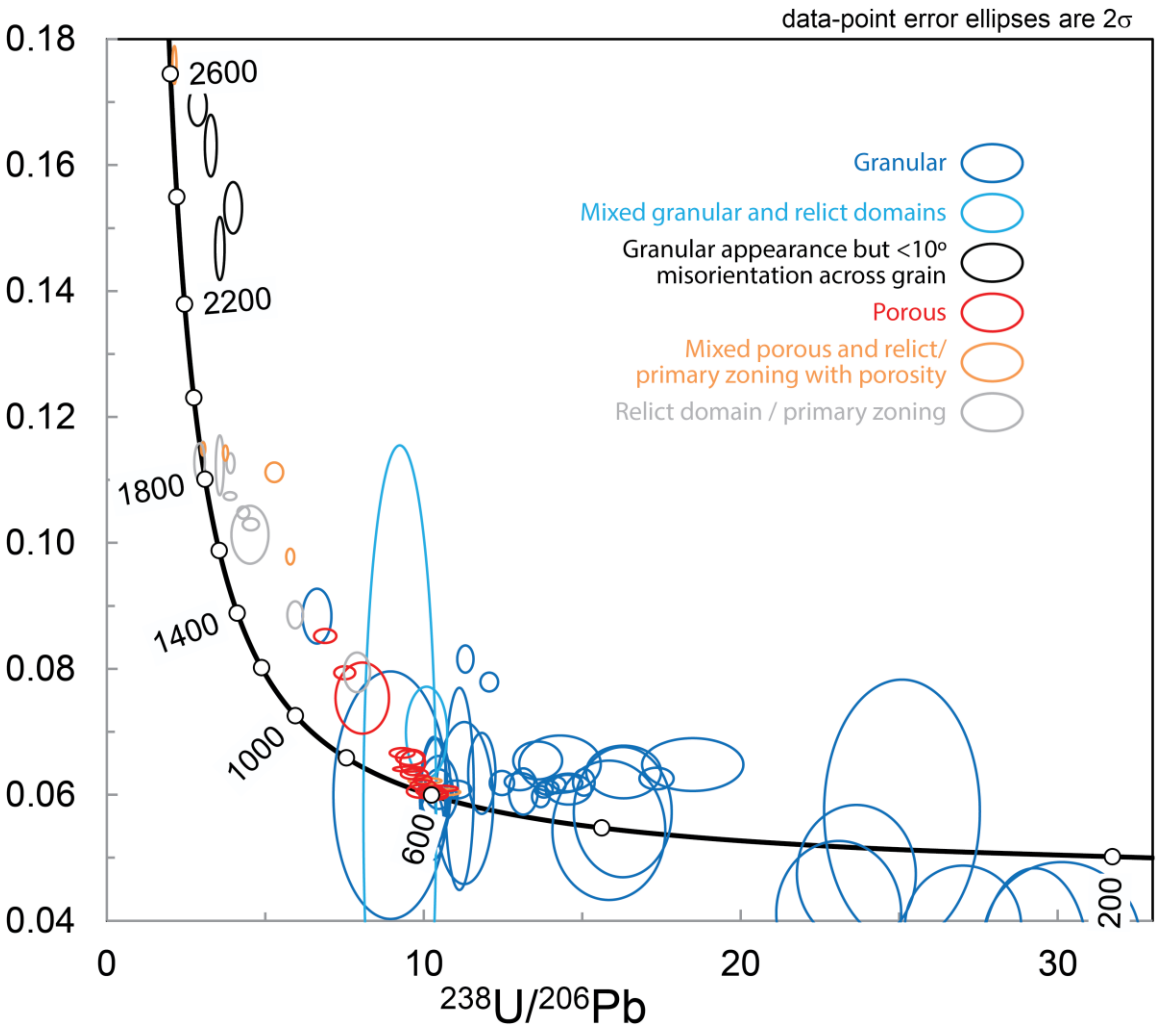
Supplementary Figure 5. Imaging and EBSD analysis of grain n1050_IMP-11b_z14.



Supplementary Figure 6. Post-analysis backscattered electron imaging of grain n1048_IMP-3_z5. The bright material surrounding the grain and in some analytical pits and vesicles is gold remnant from the coating for ion microprobe analysis. Pits would have been free from gold after analysis but some was trapped in a number of the pits during brief polishing to remove the coating from the rest of the grain. No evidence for the presence of ZrO_2 was encountered. The 608 ± 8 Ma concordia age was calculated from data from analytical pits C, D, G, and K.



Supplementary Figure 7. Tera-Wasserburg concordia diagram with a regression through the sub-population defining the *ca.* 1850 to *ca.* 600 Ma trend and a weighted mean $^{207}Pb/^{206}Pb$ age of analyses which record later Pb loss. MSWD – mean square of weighted deviates.



Supplementary Figure 8. Tera-Wasserburg concordia diagram coloured according to zircon texture. Note that information on texture is not available for analytical period #1 (undertaken in 2001) and so these data are not presented.