PETROGRAPHY - DESCRIPTIONS AND PHOTOS

	Number	Mineralogy	Reason	Description
CV	101181	Ka,qz,fs	Typical 'black balls'in colluvium	Most of the pisoliths have a cutan, though some are broken, revealing the sandy core. The cores of the pisoliths consist of close-packed angular to shardy fragments of quartz and microcline, reaching 3 mm in size. The quartz is strained and some contains minute laths of green tourmaline. There are a few variably goethite-stained clay glaebules and some hematite granules in the core. These are set in a minimum of iron-stained kaolinite matrix. The cutan (5-10%) consists of similar, but more loosely packed, angular quartz and microcline with clay glaebules, set in a brown aluminosilicate cement that is banded with brown goethite and black hematite. GRANITE-DERIVED
CV	101184		Colluvium. Depositional sandplain with weak rise. High Mn.	The pisoliths are worn, exposing the sandy cores. The cores consist of loosely packed angular, strained quartz and minor microcline and ferruginous clay glaebules, set in several generations of goethite-stained clay matrix and aluminosilicate cement. This is permeated by patches of Mn minerals, probably hollandite (small Ba content). The cutans vary in thickness (20-30%), have a similar mineralogy but the Mn minerals form discontinuous layers. GRANITE DERIVED.
CV	101238	Ka,qz,gt,ru	Colluvium. Edge of depositional plain. High Mn	The pisoliths are worn. Partly exposing the sandy cores. The cores consist of angular, strained quartz and minor microcline and some clay glaebules. These are loosely packed in a matrix of goethite-stained clay. Voids have been filled with brown, slightly banded aluminosilicate cement and Mn minerals have penetrated the matrix. The cutans are minor (<5%), partly developed and consist of fine-grained angular quartz set in goethitic clay and banded with Mn minerals. GRANITE DERIVED
LTGS	101292		Windimurra. High Fe (70%) and Cr (1000) - greenstone	The pisoliths are round but slightly chipped with a yellow-brown cutan and deep red or black cores. The cores are complex, consisting of islands of cracked and fragmented hematite, surrounded by goethite. This has been, in turn, cracked and penetrated with grains of quartz and goethitic clay. This merges with the cutans (2%) that consist of delicately banded goethite and goethitic clay. GREENSTONE DERIVED
?	101425_1	Ka,qz,gt,hm	Edge of breakaway. 'Old' pisoliths, high position	The pisoliths are round, yellow-brown and partly worn, revealing their cores. The core consists of fragments of subangular quartz and numerous clay glaebules moderately closely packed in goethite-stained clay and permeated by very thin veinlets of hematite. The very thin (<2%) discontinuous cutans consist of weakly Fe oxide-stained clay and a few very fine, angular grains of quartz. FROM A DEEPLY WEATHERED TERRAIN
LTGS	101612		Yarndee. Greenstone-derived Cr 1100 ppm	These red-brown pisoliths are quite round, with largely intact cutans. The cores consist of hematitic clay, containing fragments of fretted quartz and hematite, and a few voids lined with delicately banded goethite and hematite. The cutan is thin (<2%) and consists of goethite-stained clay with a few included chips of hematite. and possibly some stained clay glaebules. PROBABLY MAFIC

LTGS	101768		Another example from greenstone	The pisoliths are yellow-brown and smooth, with intact but cracked cutans. The core consists of small lozenges and fragments of hematite, quartz and goethite, set loosely in a porous, goethite and hematite stained clay. This has cracked and is thinly veined with hematite. The clay matrix also contains fragments of brecciated clay. The hematite of the outer part of the clay pisolith has been hydrated to goethite. The cutan is thin (2%) and consists of layers of goethite clay with a few small chips of hematite. PROBABLY MAFIC.
CV	101862		CV below breakaway 70% Fe, 3% Ti Close to 101862_1	The pisoliths are round but many are worn and vary in colour from deep red-brown to yellow-brown. The cores are complex and consist of internally banded goethite ooliths and fragments of subround to fretted quartz, loosely packed in goethitic clay. Some ooliths contain internal ooliths, indicating a complex, multi-cyclic environment. Although cutans are largely absent, there are a few remnants of adhering patches of a young generation of goethitic clay and goethite. PROBABLY MAFIC
LT	101862_1		LT above breakaway 37% Fe and 0.4% Ti Close to 101862	The pisoliths are yellow, mottled with red and round. The core consists of shardy quartz loosely packed in goethitic clay. This has been veined with a second generation of goethitic clay. One pisolith is very goethite-rich and retains a fingerprint fabric indicating degraded kaolinitic saprolite. The cutan (2%) is a delicately banded ferruginous argillan. The saprolitic pisolith has no cutan. The mixture of saprolitic and pedolithic materials suggests a mixed provenance and some transport of the lateritic residuum. PROBABLY IN PART FELSIC
CVGS	102062	Ka, gt, hm, qz	Colluvium. Slight rise. Mt Gibson	The nodules are subround to subangular, are yellow-brown, mottled with red and show little development of cutans. Two of the three pisoliths have goethitic cores with fingerprint fabrics containing books and stacks of phyllosilicates (probably kaolinite and hydromuscovite). Both are spongy and the voids in one are infilled with crystalline carbonate. One has a very thin, discontinuous cutan of ferruginous clay; the other has adhering patches of ferruginous clay. PROBABLY MAFIC.
CVGS	102062_1		Colluvium – see photos. Mt Gibson	The pisoliths are round, yellow-brown mottled with red and have slightly chipped and cracked but well-developed cutans. The pisoliths are complex, containing internal pisoliths of hematite-stained spongy clay. Many have either thin cutans, or a gradational goethite-stained rim. Many of these small pisoliths, in turn, contain clay balls and glaebules. All these are set in ferruginous spongy clay, set with small clay granules and chips of quartz. The pisoliths have a discontinuous, thin (2%) cutan of unstructured ferruginous clay. One pisolith has a core of hematite- and goethite-stained clay with a remnant fingerprint fabric after saprolitic clays. GREENSTONE DERIVED BUT OF MIXED REGOLITH PROVENANCE.
LTGR	102103		LT. Fretting seems to be restricted to those pisoliths on surface. See photos.	There are two pisolith types: i) round, yellow-brown, smooth with cutans mottled with red and ii) dark brown, rough cores lacking cutans. The cores of both types are similar and consist of moderately closely packed angular to shardy quartz and a few clay glaebules set in a matrix of hematite-stained clay. Some voids are lined with a deep brown, banded aluminosilicate cement. The pisoliths have a gradationally goethite-stained rim. The cutan, where present, is a thin (1%), layered, goethite-stained argillan. GRANITIC TERRAIN

LTGR	102270	Ka,qz,gt,hm	LT. Layer below 0.7 m in sand. Nodule with hole	The pisoliths are yellow but the cutans are thin and partly worn. The core consists of subangular to fretted strained quartz, loosely packed in hematitic clay balls and deep-brown aluminosilicate cement. The pisoliths have a graded goethite-stained rim. The cutan is a very thin, delicately banded, goethitic argillan. GRANITIC TERRAIN
LTGR	102351	Ka,qz,gt,hm	LT. Gravel pit. Nodule with hole	The pisolith are round and yellow but the cutans are thin and discontinuous, revealing the sandy core. One has a hole in its core. The cores consist of loosely packed angular to shardy quartz and numerous clay balls and glaebules set in hematitic clay. The pisoliths have gradational rims of goethite-stained clay. The cutans are thin (<2%) goethite-stained argillans. GRANITIC TERRAIN
LTGR	102651	Ka,qz,gt	LT. Strange nodules ? ferricrete. 'Old' pisoliths	The pisoliths are yellow, slightly mottled with red, round and rough. They consist almost entirely of a core of angular to shardy quartz and a small number of clay glaebules, closely packed into hematitic clay. The pisoliths have a gradational rim of goethite staining in the matrix. There are traces of adhering less stained clay and fine quartz, possibly forming a remnant of a poorly structured cutan. Quartz grains project from the margin of the pisolith. One pisolith has a hole, partly filled with fine, angular quartz and cemented by relatively clear, weakly banded aluminosilicate. GRANITIC TERRAIN.
LTGR	102690		LT. Top of hill. Nodules in sand. 'Old' pisoliths.	The pisoliths are yellow-brown to deep yellow-brown and are round but very rough. Two of the larger pisoliths lack cutans; one smaller one has a thin cutan and a gradational goethite-stained rim. The cores of all consist of coarse quartz grains (up to 4 mm) of subangular, strained quartz packed tightly with smaller, shardy quartz grains in a hematitic clay matrix. The hematite in the matrix permeates from a network of very fine hematite veinlets. Quartz grains protrude from the edges of the larger pisoliths. The cutan on the smaller pisolith is a poorly structured, weakly goethite-stained argillan with chips and small grains of quartz. GRANITE
LTGR	102784	Ka,qz,gt,hm	LT. Upper slope of low hill on granite. Nodule with hole	The pisoliths are subround and yellow, with thin, partly worn cutans. The thin section gives a longitudinal view of a nodule with a hole in the centre. The core of the nodule consists of subangular to shardy quartz grains and numerous clay balls and oolitic glaebules. Many glaebules have a felted, relatively unstained clay core and an intensely stained, concentric argillan. All these are closely packed in a hematitic clay matrix. The outer rim of the nodule is gradationally goethite stained. The central cavity is packed with sandy, angular quartz grains and unstained oolitic clay glaebules, closely packed into an almost unstained clay matrix. The nodule has an extremely thin (<1%) and weakly goethite-stained argillan with minor quartz. GRANITE
LT	102862	Ka,qz,gt,hm	LT. Much ferruginous saprolite. Nodule with hole	The pisoliths are subround and yellow, mottled with brown with partly worn cutans. The cores consist of subangular to shardy quartz and a few matted clay fragments, loosely packed in a weakly goethite-stained clay matrix. Voids in the matrix have been completely filled with a weakly banded, light brown aluminosilicate cement showing brush extinction. The pisoliths are coated with an almost continuous but thin (2%), well-structured, banded, weakly goethite stained argillan. GNEISS OR METASED

LT	104183	Ka,qz,gt,hm	LT. Mature forrest near Collie. High S, Al, Darling Range	The pisoliths are rough, subround and are deep yellow-brown. There are three rather disparate pisoliths. Their cores consist of: i) Coarse (2 mm), fretted and fine, shardy quartz and irregular patches of massive clay stained from the rim by goethite. These lie loosely in a matrix of goethite-stained clay. ii) Coarse jig-saw quartz grains (4 mm) largely in optical continuity are set in a massive clay containing books and expanded stacks of muscovite and clay after remnant mica, variably stained by goethite. iii) Coarse, fretted quartz and a few small mica balls and glaebules set in a matrix of massive, goethite-stained clay. Only the first pisolith has a poorly structured discontinuous argillan, scattered with quartz grains. The others show quartz grains protruding from their margins. COMPLEX METAMORPHIC TERRAIN WITH QUARTZ VEINS AND LENSES
LTGR	104457		LT. On granite. Rasp cutan. 'Old' pisoliths from topo high.	The pisoliths are yellow-brown and rough, with cutan remnants. The pisoliths have cores of coarse, subangular polycrystalline strained quartz, packed tightly in fine, angular to shardy quartz and a minimum of goethite-stained clay. In places, the matrix has been removed and replaced by yellow-brown, weakly banded aluminosilicate. A poorly structured cutan of clay and quartz is discontinuously developed but, where it is absent, quartz grains protrude from the pisolith margins. GRANITE
LTGR	104481	Ka,qz,gt	LT. Quartz in nodules. 'Old' pisoliths from topo high. Dumbleyung.	The pisoliths are subround and yellow brown, most with a rough surface. The cores consist of subangular to shardy quartz grains, closely packed in a ferruginous clay matrix. Cutans are discontinuous but thick (10-15%) and consist of a poorly-structured open mesh of quartz in clay that is lightly stained with goethite. The clay matrix of some of the outer parts of the pisoliths has been replaced by a deep brown, partly banded aluminosilicate cement showing brush extinction. Where the cutans are absent, grains of quartz protrude from the margins. GRANITE
LT	104610	Qz,ru,hm	LT. High alkaline. North of Fitzgerald River	The pisoliths are subround, red-brown and rough, showing a few large quartz grains, and lack cutans. The cores consist of angular to shardy quartz grains, ferruginous granules and clay fragments, packed closely in a hematite-stained clay. The ferruginous granules consist of angular quartz very loosely packed in hematite. The hematite contains some weakly developed phyllosilicates remnants. There are no cutans. COMPLEX REGOLITH PROVENANCE
LT	104661	Qz,ka,ru,fs	LT. Gravel pit. High alkaline (Mg, Ca, Na) content.	The pisoliths are yellow-brown, subround and rough, some showing protruding quartz grains and have worn cutans. The cores consist of coarse, subround and fine, angular to shardy quartz grains fairly closely packed in a matrix of goethite-stained clay and banded, brown aluminosilicate cement. The cutans are thick (>20%), discontinuous and consist of poorly structured weakly goethite-stained clay and fine angular quartz.
LT	104663	Ka, qz	LT. Gravel pit. High alkaline.	The pisoliths are yellow-brown to brown, partly worn and round. The cores of the pisoliths consist of subround to angular quartz grains that are very loosely packed in yellow, goethite-stained clay. The cutans are thick (40%) and discontinuous, consisting of round to angular quartz grains tightly packed in a yellow goethite-stained clay. The cutans show a rough, semi-concentric banding related to Fe oxide staining and possibly some opaque QAZ cement.
				ka = Kaolinite: qz = qyartz: fs = Feldspar: gt = Goethite: ru = ruitle: hm= hematite


101181
2 cm


101184
2 cm


101238
2 cm


101292
2 cm


101425_1
2 cm


101612
2 cm


101768
2 cm


101862_1
2 cm

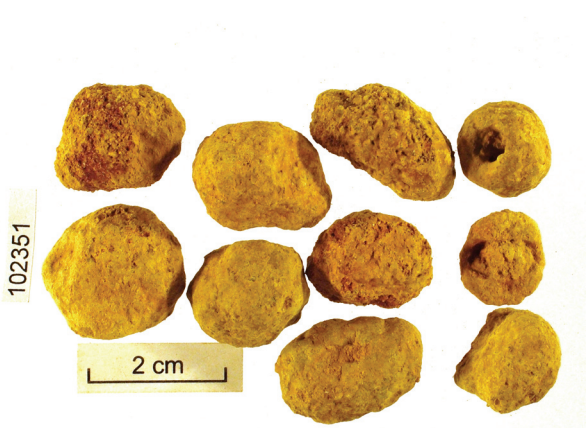

101862
2 cm


102062_1
2 cm


102062
2 cm


102103
2 cm


102270
2 cm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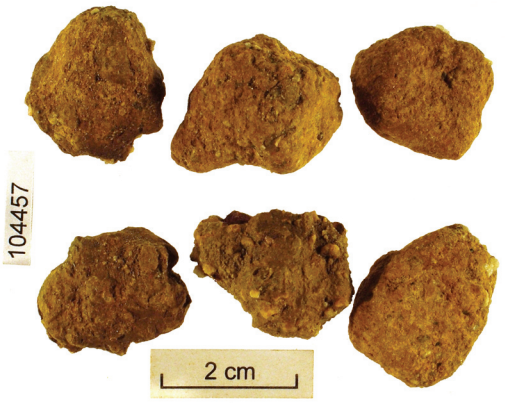
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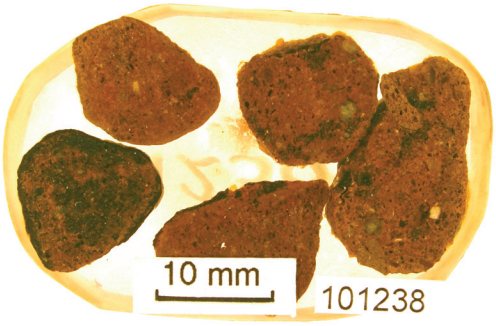
POLISHED BLOCKS


101184
10 mm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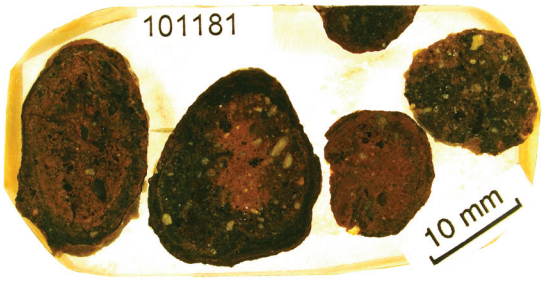
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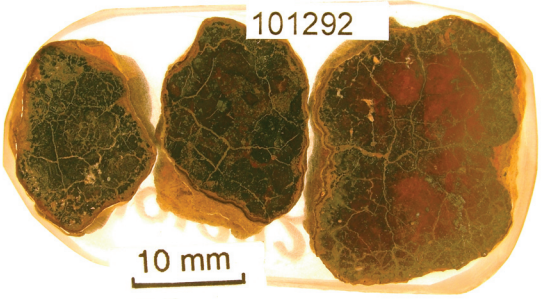
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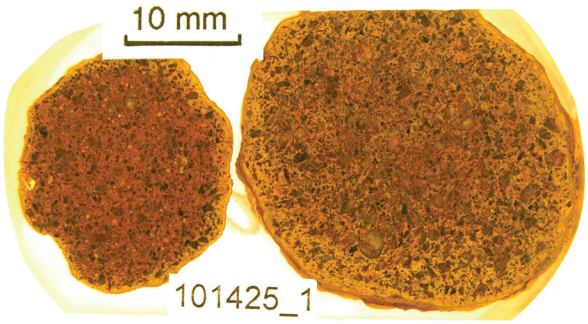
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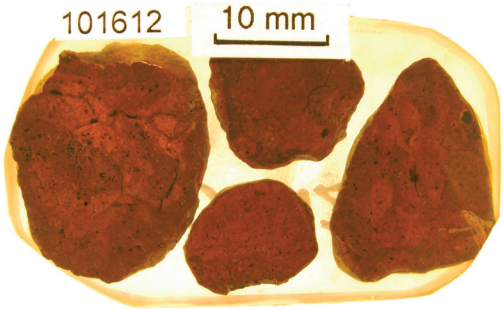
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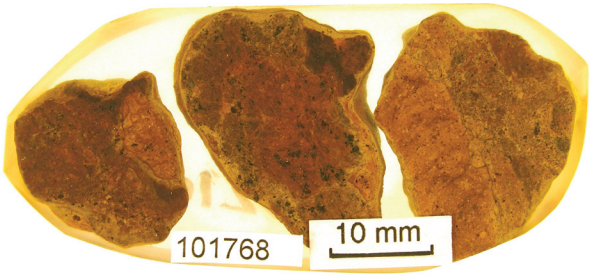
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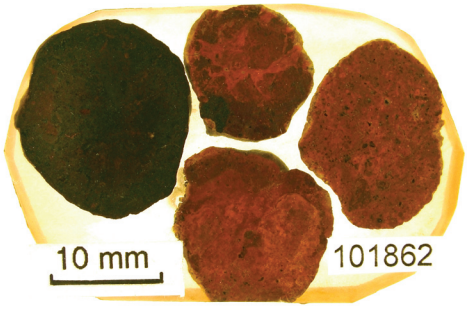
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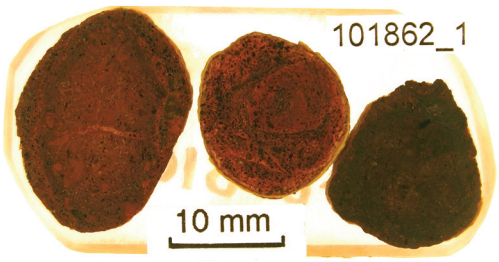
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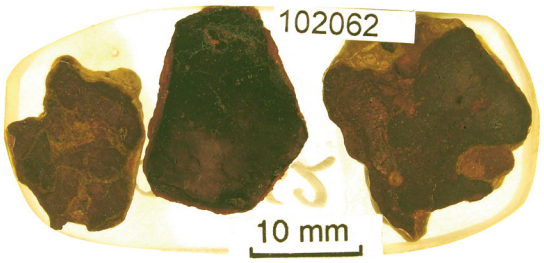
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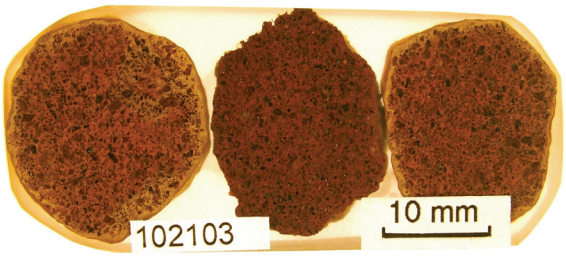
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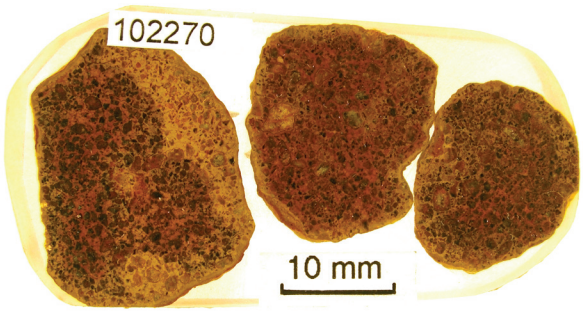
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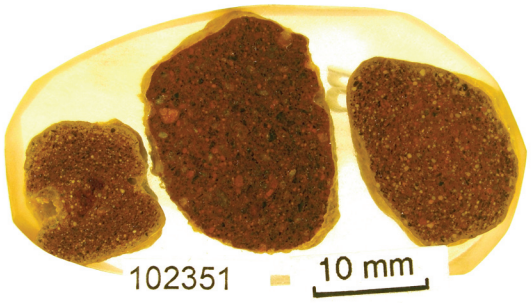
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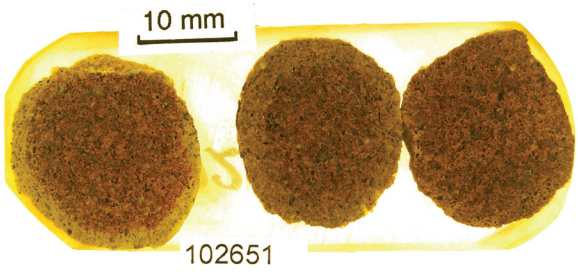
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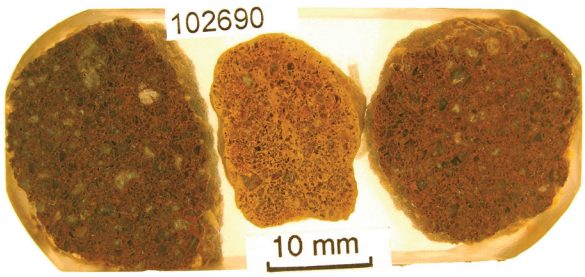
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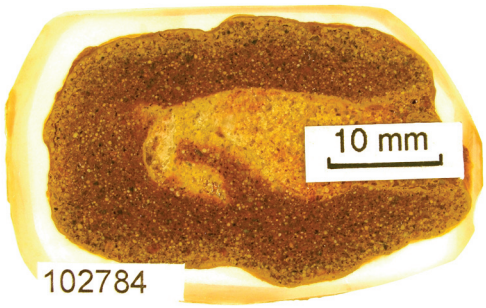
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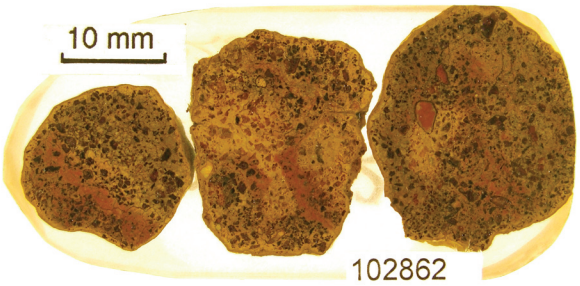
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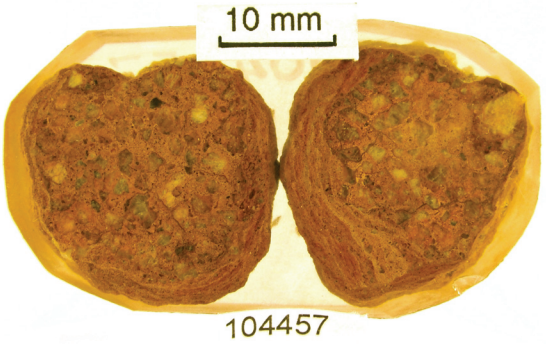
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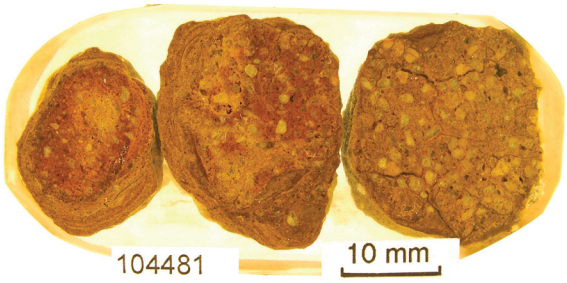
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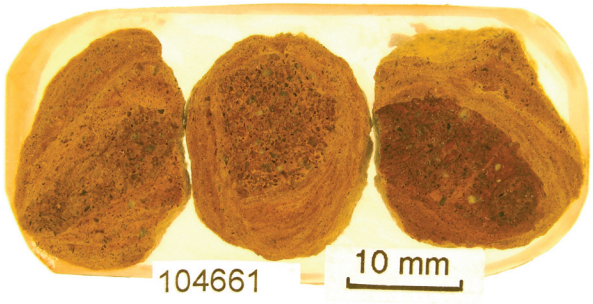
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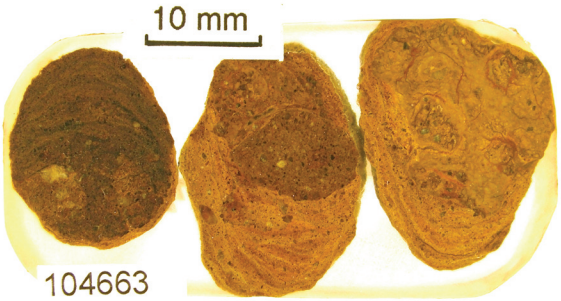
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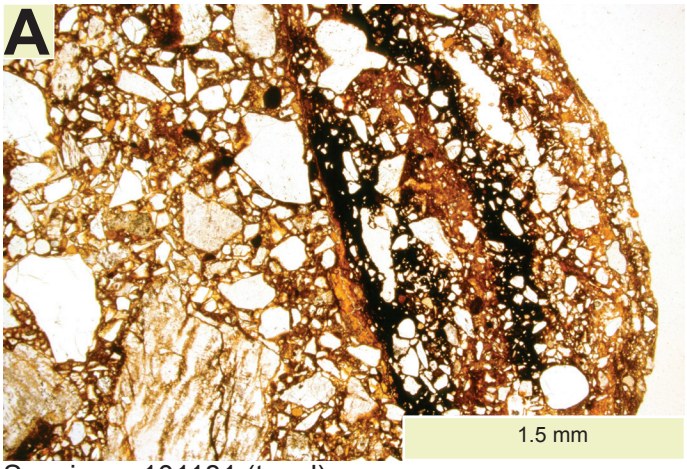
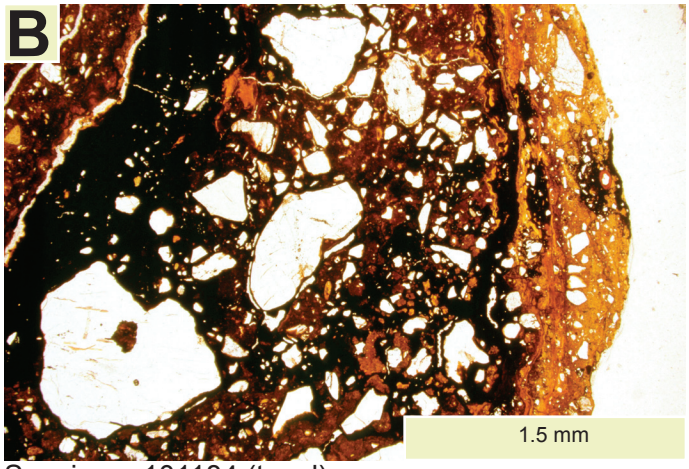
Thin and Polished Sections

Abbreviations:
txppl = Transmitted plain polarized light
nrf = Normally reflected light



Specimen 101181 (txppl)



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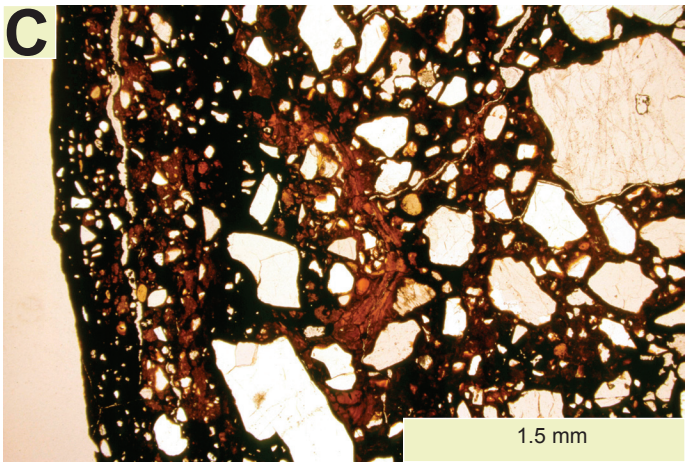

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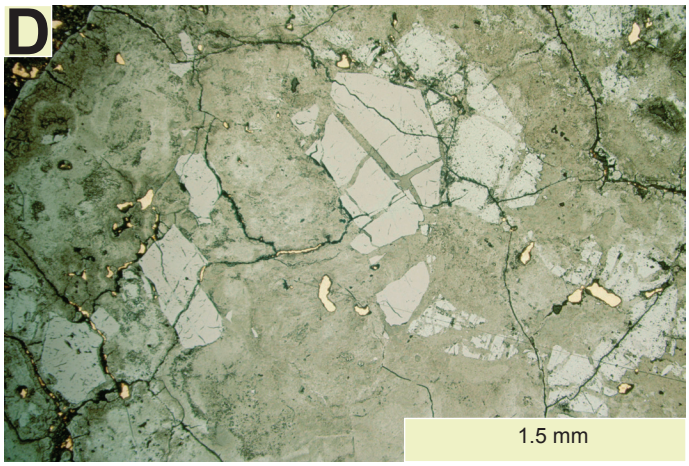

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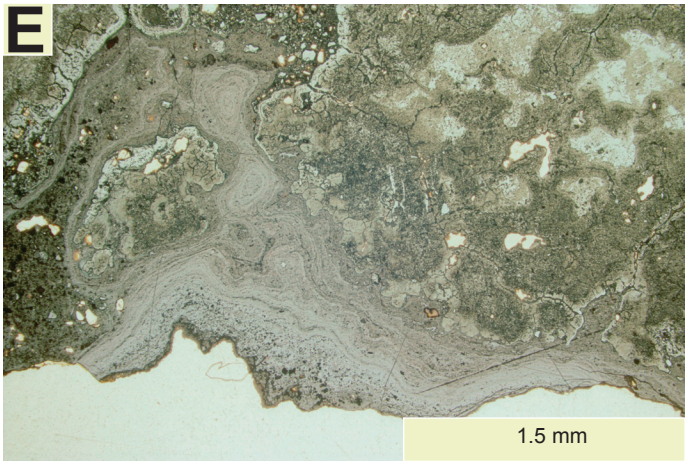

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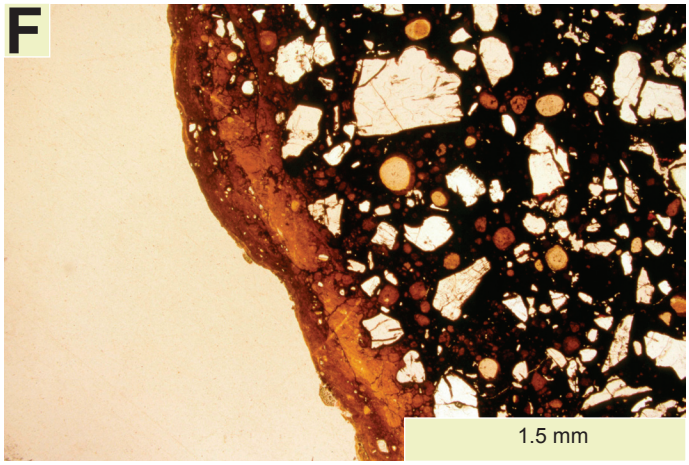

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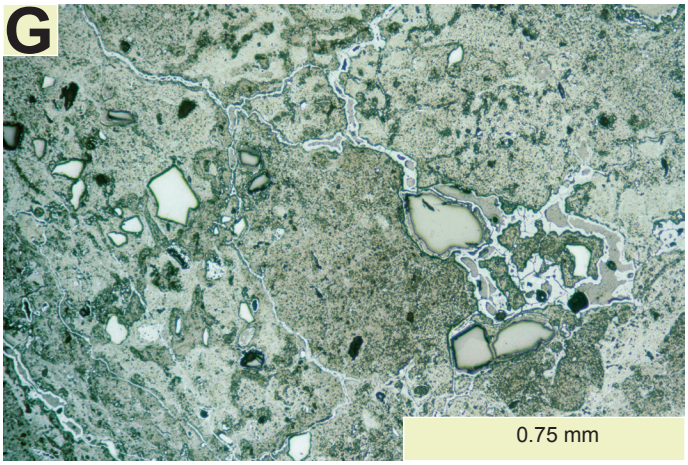
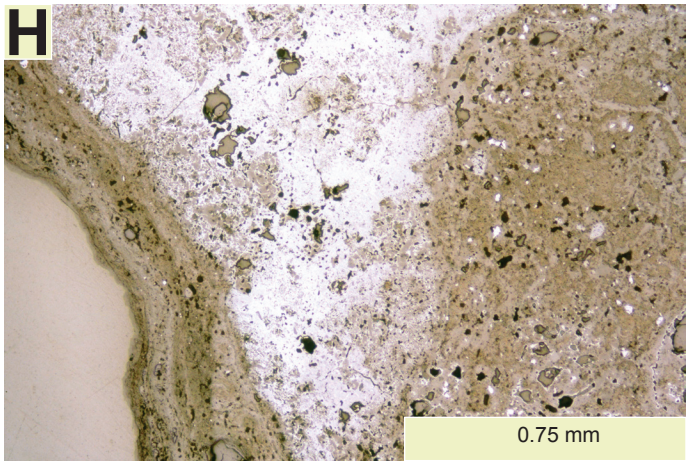
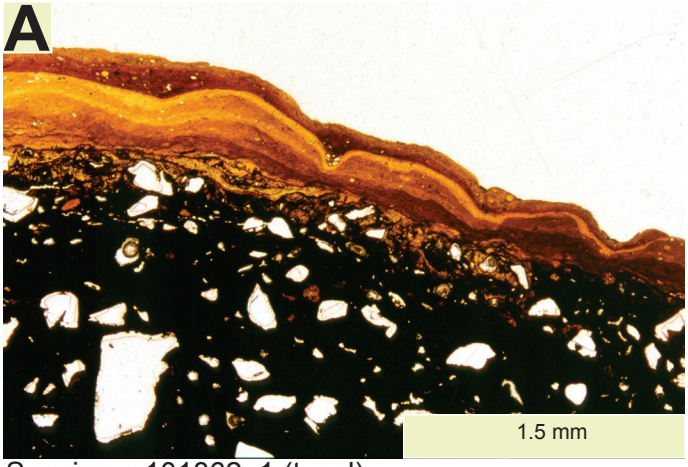


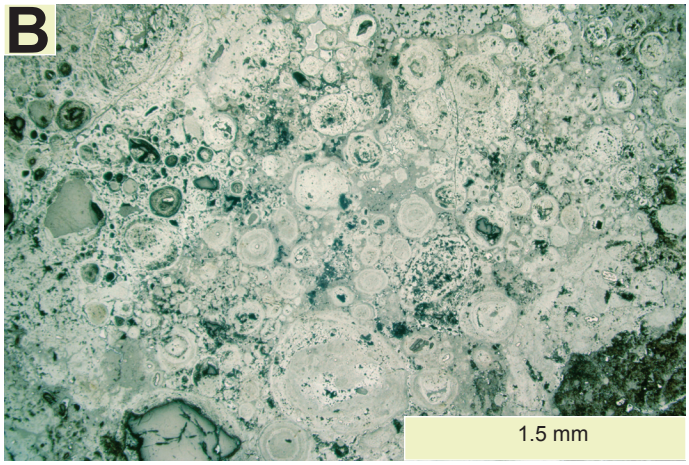
Specimen 101612 (nrf)



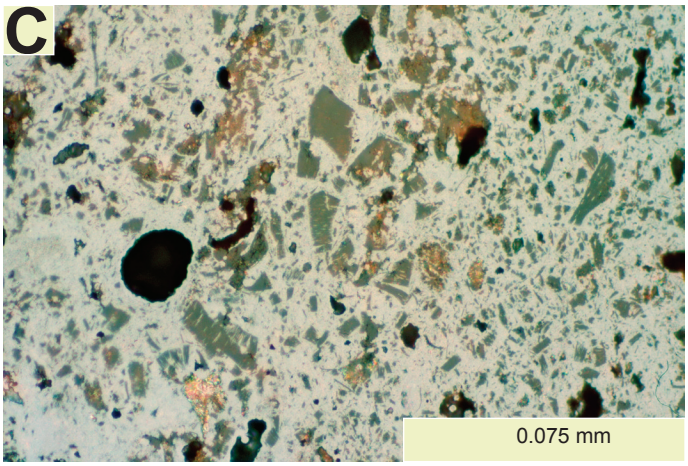
Specimen 101862_1 (nrf)



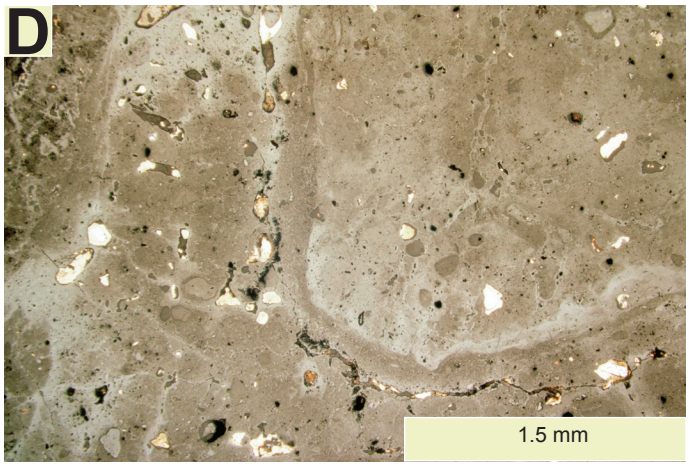
Specimen 101862_1 (txppl)



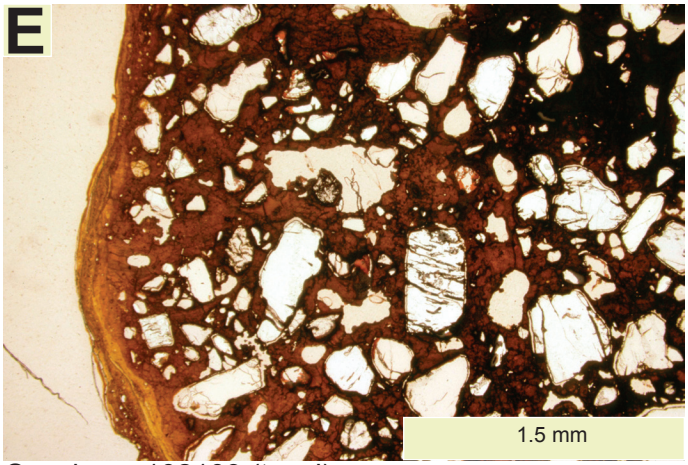
Specimen 101862 (nrl)



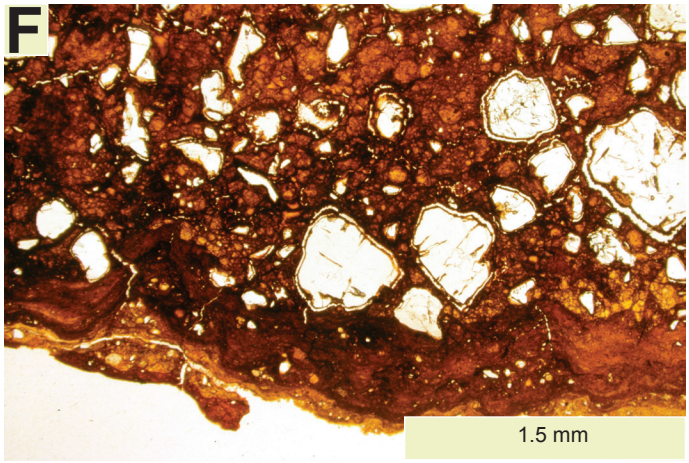
Specimen 102062 (nrl)



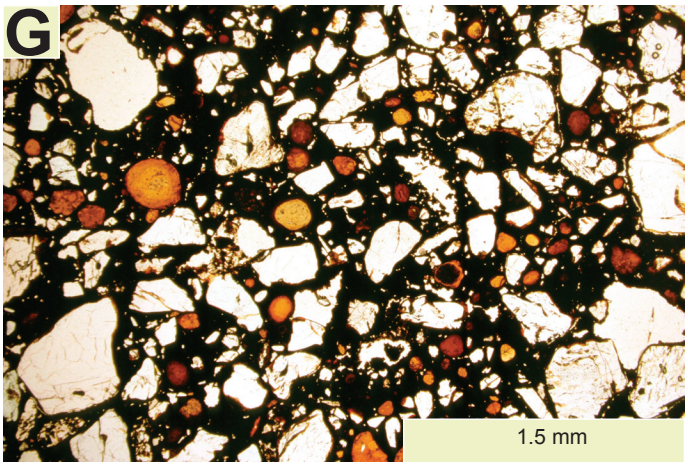
Specimen 102662_1 (nrl and txppl)



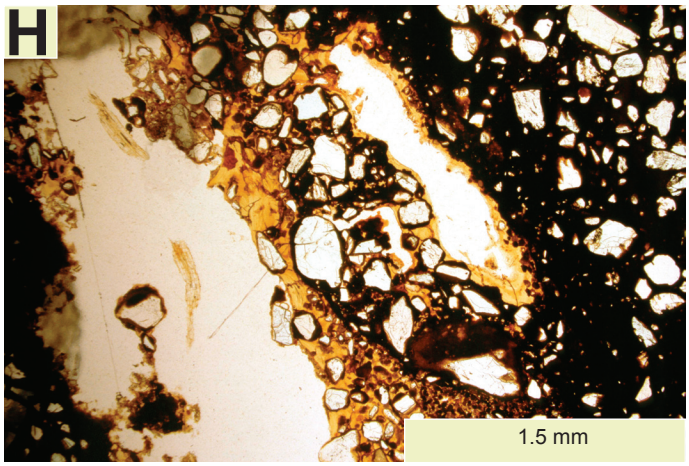
Specimen 102103 (txppl)



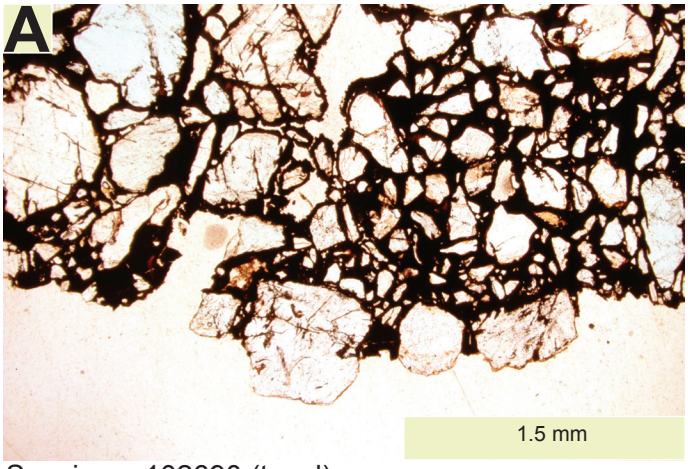
Specimen 102270 (txppl)



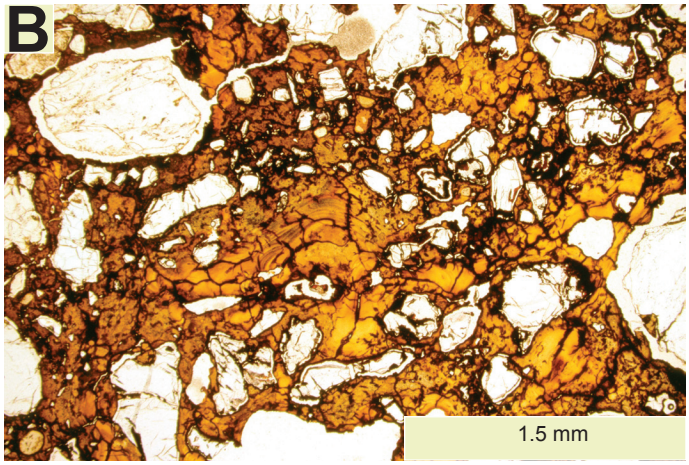
Specimen 102351 (txppl)



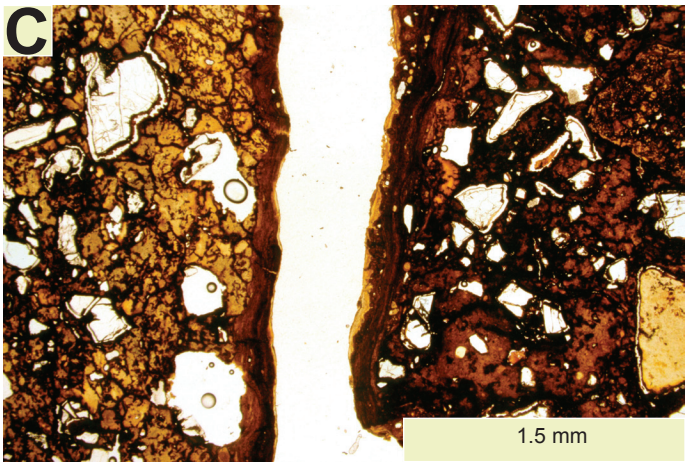
Specimen 102651 (txppl)



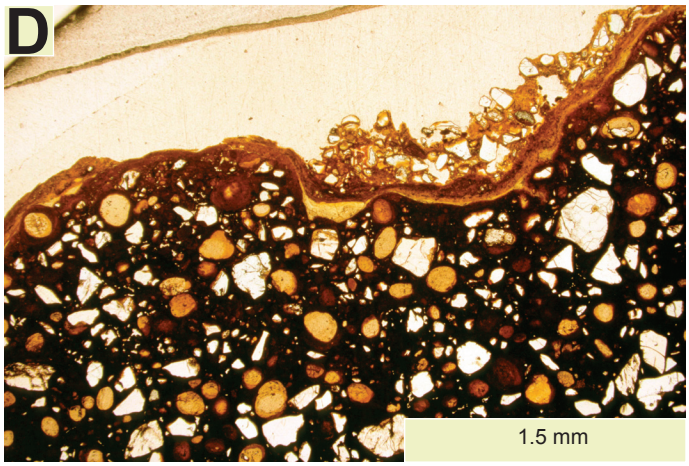
Specimen 102690 (txppl)



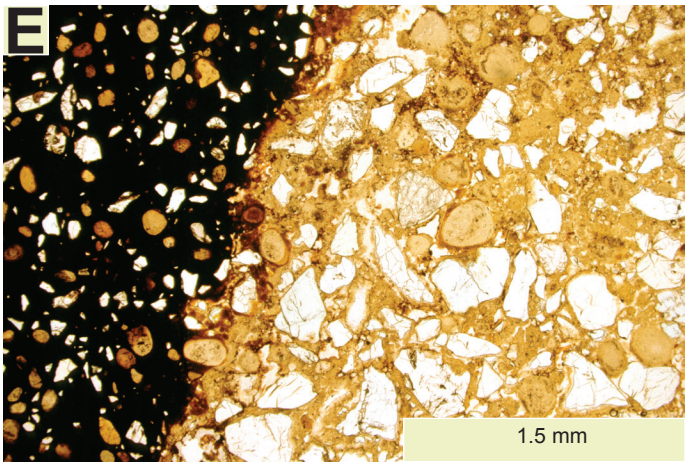
Specimen 102862 (txppl)



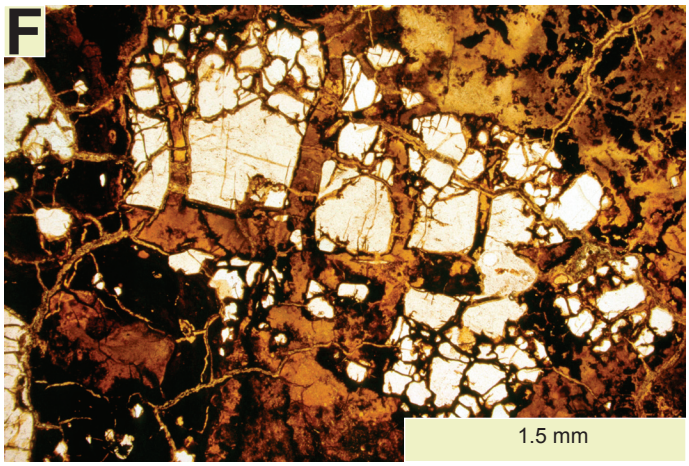
Specimen 102862 (txppl)



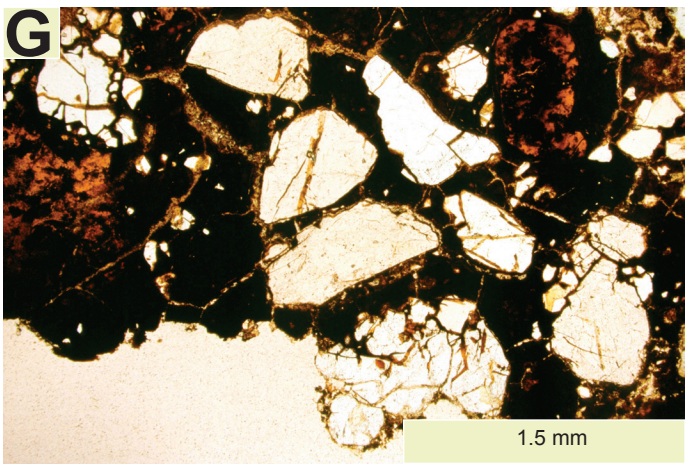
Specimen 102784 (txppl)



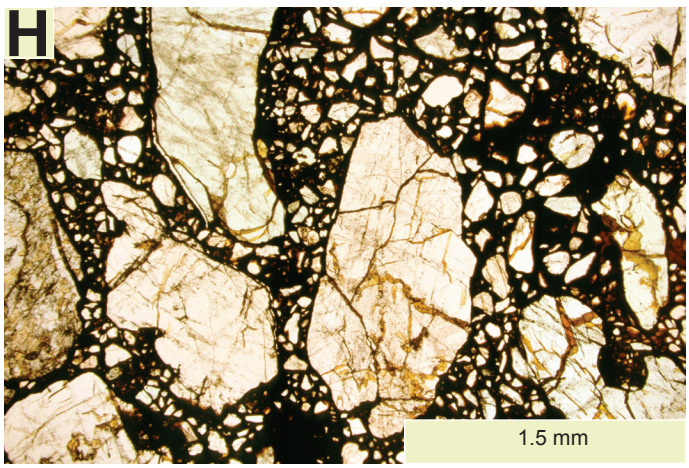
Specimen 102784 (txppl)



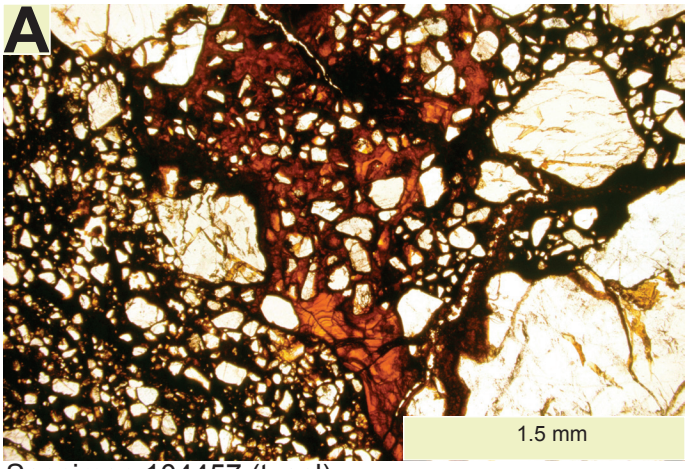
Specimen 104183 (txppl)



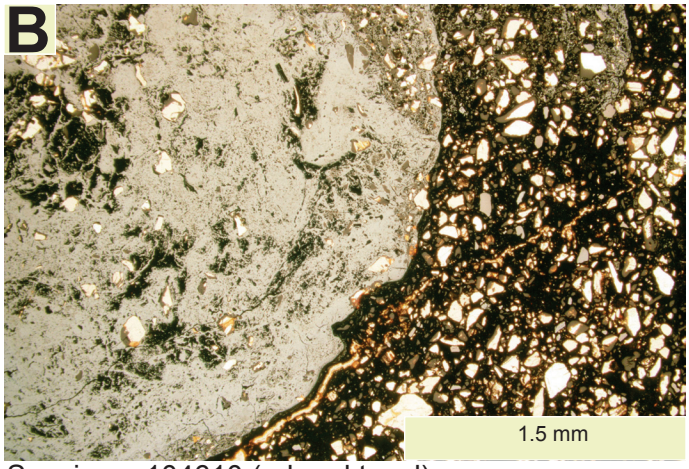
Specimen 104183 (txppl)



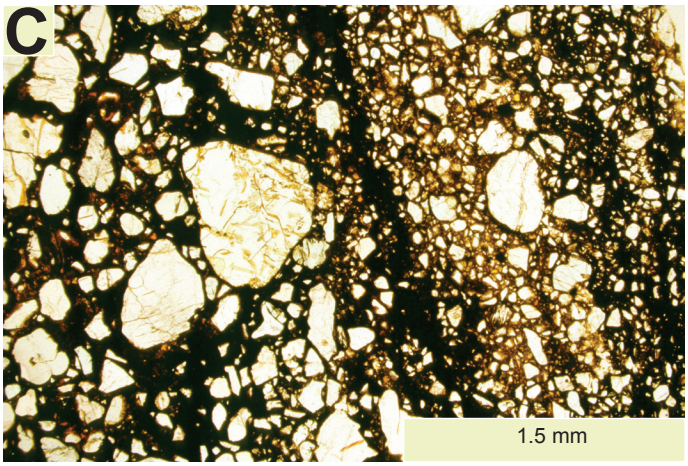
Specimen 104457 (txppl)



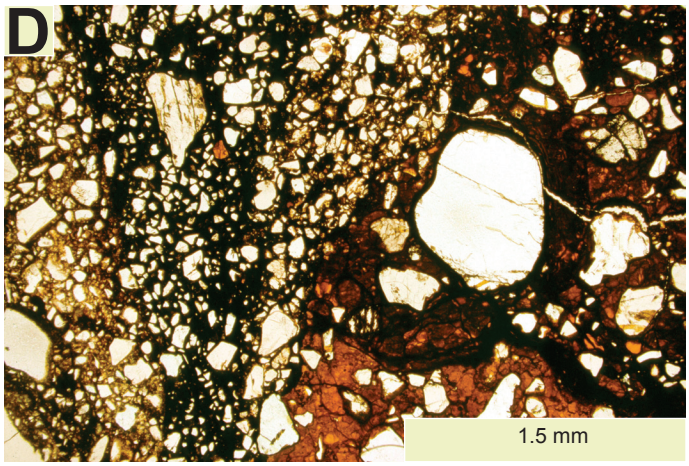
Specimen 104457 (txppl)



Specimen 104610 (nrl and txppl)



Specimen 104661 (txppl)



Specimen 104663 (txppl)