Reflection			G		Other	いる 一大学 いいり は のない は 知事ない	Open Nicol			The state of the s	では、 は、 は	STATE OF BRIDE	or o	Cross Nicol			を対しているとなった。	する。	0-lmm G: Goethite
		Black massive limonite / goethite. Massive and it dose not show any particular texture. Pores of 1 to 2mm across are scattered and milky white calcite is rarely found filling pores of less than 1mm across. It has smooth surface and it does not attach to hand.				Descriptions					Descriptions			Descriptions		f goethite. Some of the quartz fills		Descriptions	Some of quartz fill fractures, showing vein appearance.
		issive and is d and milky s smooth sur				Abundance	85 %				Abundance			Abundance		ling pores		Abundance	% L
PSOS	altered rock	Black massive limonite / goethite. Massive and it dose Pores of 1 to 2mm across are scattered and milky white pores of less than 1mm across. It has smooth surface a		to oolitic		Grain Size	1				Grain Size			Grain Size		across occurs fil		Grain Size	0.01 ~ 0.1 mm
05SMC12AD16	: Strongly altered rock	nassive limoni of 1 to 2mm ac of less than 1	obe	iive		Shape	massive to oolitic		scope		Shape			Shape		. 01 to 0.1mm	vein appearan	Shape	fragment
Ser. No. 09	Name	1	Reflection Microscope	Texture : n	Ore Minerals goethite	Mineral	Goethite	Gangue Mineral	Polarization Microscope	Clastics:	Mineral		Matrix	Mineral	Alteration	Secondary Minerals: Quartz mosaic of 0.01 to 0.1mm across occurs filling pores of goethite.	Iracture, snowing vein appearance	Mineral	Quartz

Kell		175	1		Ope	V.	***		1 &			Cro					
	3 X 3cm platy fragments of manganese crust. It is black and massive with botryoidal surface of 2 to 3mm across. In lower part, a layer with scattered distribution of pale brownish gray calcareous fillings of 1 to 2mm across occurs showing relatively sharp contact with upper part without calcareous fillings. In the upper part, abundant pores of less than 5mm across filled by limonite occur in the network band of 2 to 3 mm wide. It has relatively smooth surface and it does not attach to hand.				Descriptions	Broad peak at vernadite 2.4A.			Clastics: Limestone with basalt fragments contact to manganese oxides. It includes basalt fragments and crushed grains of plazioclase.	Descriptions	Volcanic origin Volcanic origin Attached to Mn oxides with sharp contact	included in Imestone. Consists of recanguar palgioclase and cryptocrystalline groundmass.	Descriptions			Descriptions	
	crust. It is the with scatt ccurs showing part, abunct of 2 to 3 mm				9	% 09			nese oxides. I	Abundance	1 % 20 %	3 %	Abundance			Abundance	
9 PS01	se Crust ents of manganese In lower part, a lay, 1 to 2mm across or illings. In the upper the network band of	oform.			Grain Size	I			contact to mangan	Grain Size	$^{\sim} 0.05$ $^{\sim} 0.2$ $^{\sim} 8$	0.2 ~ 2 mm	Grain Size			Grain Size	
05SMC12AD29	ime : Manganese Crust 3 X 3cm platy fragments of r of 2 to 3mm across. In lower calcareous fillings of 1 to 2m without calcareous fillings. I by limonite occur in the netw it does not attach to hand.	ope Spotted to colloform.		(vernadite)	Shape	Spotted to colloform		oscope	asalt fragments se.	Shape	fragments fragments shapless	Sub-angular to sub-round	Shape		lls	Shape	
Sample No.	Rock (ore) Name Hand 3 X 3 Speciment of 2 t calca withc	Reflection Microscope Texture : Spo	rals	manganese oxides (vernadite)	Mineral	Vernadite	Gangue Mineral	Polarization Microscope	Clastics: Limestone with basa grains of plagioclase.	Mineral	Quartz Plagioclase Limestone	Volcanic rocks Matrix	Mineral	Alteration	Secondary Minerals	Mineral	

Vn: vernadite Pl: plagioclase

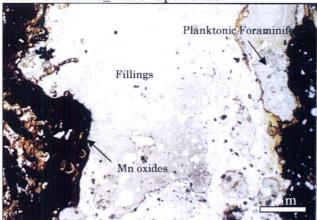
Reflection		VV				Owen Minel	Open Micon						0.1mm	Cross Nicol						0.1mm Vn: vernadite
		7cm long cross section of manganese oxides. It is black to pale brownish gray, and pores of 2 to 3mm across are irregularly distributed. Limonite is attached in some of the pores. In upper layer from the surface to 5cm, pores of less than 5mm across are filled by calcareous fillings (fragments of carbonate rock?). The surface is slightly granular, it attaches to hand.				December	Descriptions Broad peak at vernadite 2.4Å.			ur in interstices of Mn oxides	Descriptions		volcanic origin Plagioclase phenocrysts of 0.02mm acrosss occur.		Descriptions				Descriptions	
		ides. It is bla Limonite is : less than 5mi face is slight!				Abundana				nd basalt occur	Abundance		2 % <1 %		Abundance				Abundance	
90Sd 6	Cr	on of manganese ox gularly distributed. ce to 5cm, pores of 1 iate rock?). The sur		oform s.		Oution Circ				Clastics: Fragments of quartz and playicclase of volcanic origin and basalt occ	Grain Size	_	$0.01 \sim 0.2 \text{ mm}$ $\sim 0.4 \text{ mm}$		Grain Size	¥.			Grain Size	
05SMC12AD29	: Manganese Crust	ong cross section across are irregion the surfa ients of carbon	be	massive to colloform abundant pores.	(vernadite)	Choro	nassive to colloform		cope	and plagioclase	Shape	fragment	fragment sub-round		Shape				Shape	
Ser. No. 11 Sample No. (lame	Hand 7cm le Speciment 3mm: layer? (fragn	Reflection Microscope	Texture :	Ore Minerals Manganese oxides (vernadite)	Missouri		Gangue Mineral	Polarization Microscope	Clastics : Fragments of quartz	Mineral	Quartz	Plagioclase Volcanic rosk	Matrix	Mineral		Alteration	Secondary Minerals	Mineral	

Reflection							Open Nicol									Cross Nicol						A D Well of the second of the
		Tam long cross section of manganese oxides. It is black to pale brownish gray, and pores of 2 to 3mm across are irregularly distributed. Limonite is attached in some of the pores. In upper layer from the surface to 5cm, pores of less than 5mm across are filled by calcareous fillings (fragments of carbonate rock?). The surface is slightly granular, it attaches to hand.					Descriptions	Broad peak at vernadite 2.4Å.			Clastics: Crushed cuartz and planteclas of volcanic origin and limestone fearments occur in interesticas of Mn oxides	Descriptions		volcanic origin	Foraminitera of U.2mm across occurs.		Descriptions	Coexists with Mn oxides in some of the fractures.			Descriptions	
		ides. It is bl. Limonite is ess than 5m face is sligh		re common			Abundance	% 99			raements occu	Abundance	1 %	% 60	% 02		Abundance	% 9			Abundance	
	9 PS07	The long cross section of manganese ox 3mm across are irregularly distributed. I alyer from the surface to 5cm, pores of 1 (fragments of carbonate rock?). The sur		Colloform Partly shows shapless and pores are common.			Grain Size	Ĺ			origin and limestone f	Grain Size	~ 0.06 mm	$0.02 \sim 0.08 \text{ mm}$	-		Grain Size	Ĭ.			Grain Size	
	05SMC12AD29 PS	maniganes ong cross sectio across are irreg from the surfac nents of carbon	De	Colloform Partly shows s		(vernadite)	Shape	Colloform		scope	prioclas of volcanic	Shane	fragments	fragments	snapless		Shape	cryptocrystar lline to amorphous		8	Shape	
12	Sample No. (Speciment 3mm (fragm	Reflection Microscope	Texture : (Ore Minerals	Manganese oxides	Mineral		Gangue Mineral	Polarization Microscope	Clastics :	Mineral	Quartz	Plagioclase r :	Limestone	Fe-K-Al Silicates	Mineral	Fe-K-Al Silicates	Alteration	Secondary Minerals	Mineral	

Vn: vernadite Cf. calcareous fragment Plate V Carbonate Rocks

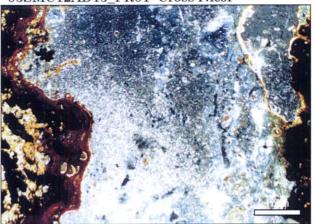
- Micrographs -

05SMC12AD15_FR01: Open Nicol

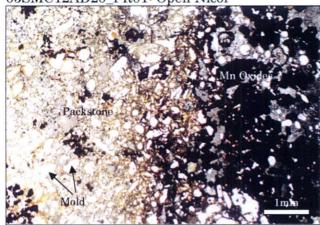


Fillings of Sediments



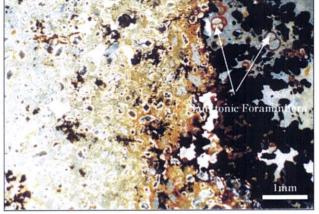


05SMC12AD20_FR01: Open Nicol

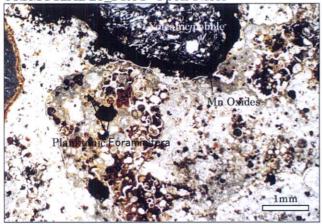


Porous bioclastic packstone and Mn oxides of the boundary

05SMC12AD20_FR01: Cross Nicol

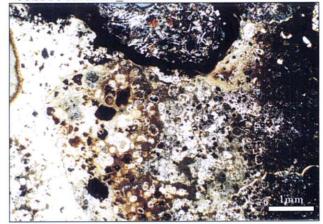


05SMC12AD25_FR01: Open Nicol

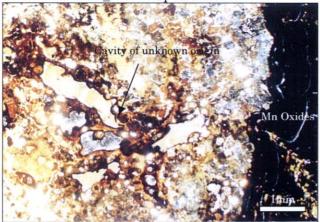


Pebbles of volcanic rock and bioturbation

05SMC12AD25_FR01: Cross Nicol

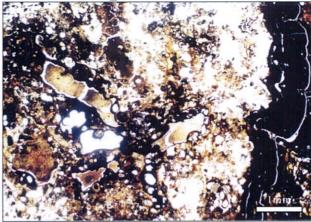


05SMC12AD29_FR01: Open Nicol

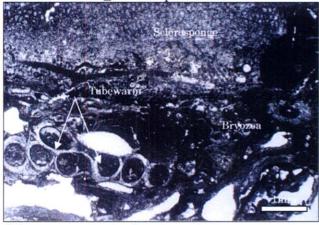


Cavity of unknown origin

05SMC12AD29_FR01: Cross Nicol

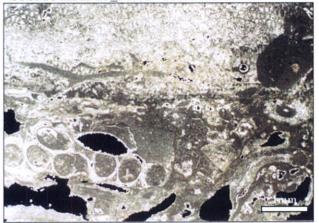


05SMC12AD29_FR02: Open Nicol

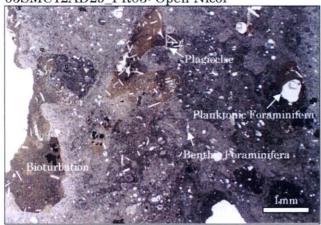


Sclerosponge and other organisms

05SMC12AD29_FR02: Cross Nicol

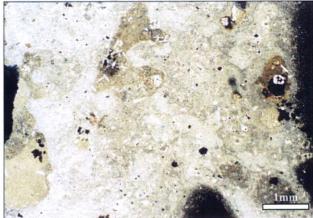


05SMC12AD29_FR03: Open Nicol

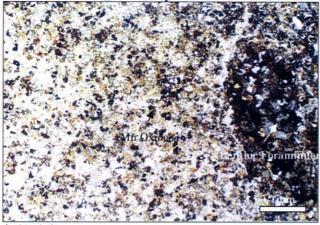


Foraminiferal pack-/wackestone

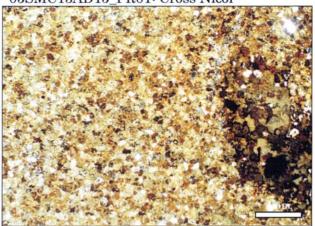
05SMC12AD29_FR03: Cross Nicol



05SMC13AD15_FR01: Open Nicol

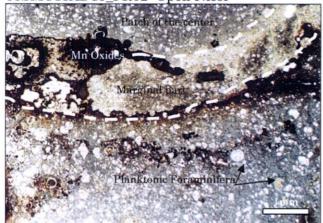


05SMC13AD15_FR01: Cross Nicol



細粒砂岩

05SMC13AD15_FR02: Open Nicol



05SMC13AD15_FR02: Cross Nicol



Large patch of the center