

BRITISH GEOLOGICAL SURVEY

TECHNICAL REPORT

Stratigraphy Series

IR/05/138

**The petrography of sandstone
samples from the Upper
Greensand Formation
in southern England.**

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(British Geological Survey)

Prepared for:

P. Hopson

Project Leader

Date **5th August 2005**

Geographical Index

U.K.

Subject Index

Petrography

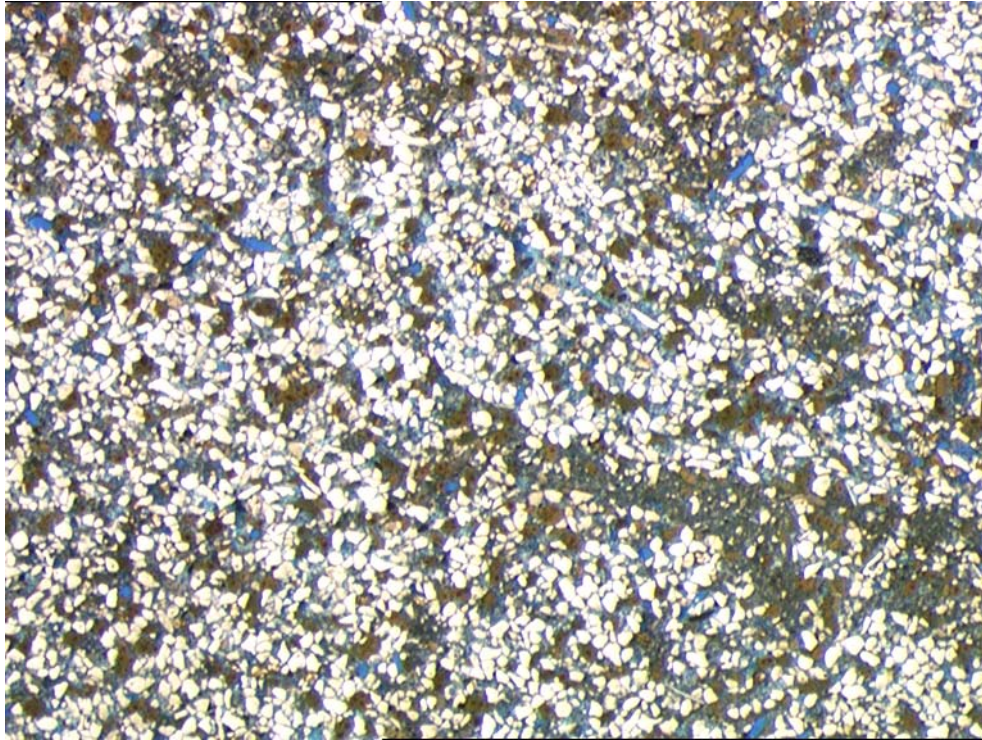
Sandstones

Upper Greensand Formation

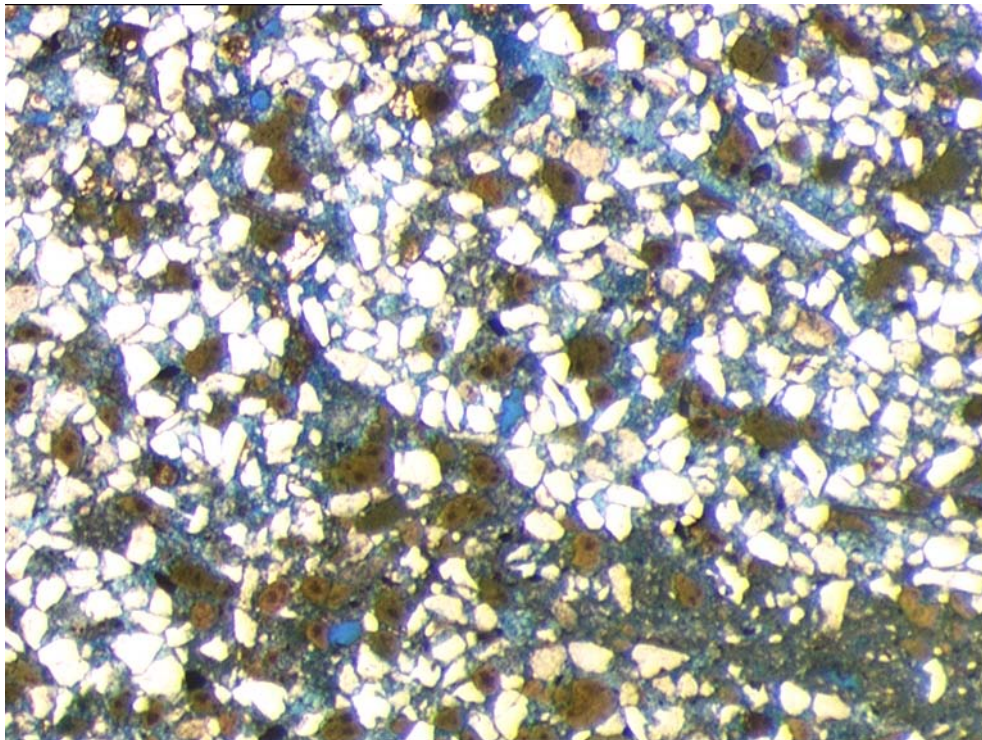
Lower Cretaceous

UK

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(Field of view 8mm left to right)



(Field of view 3mm left to right)

PQ003

Hand specimen

Calcareous and glauconitic sandstone

Thin section

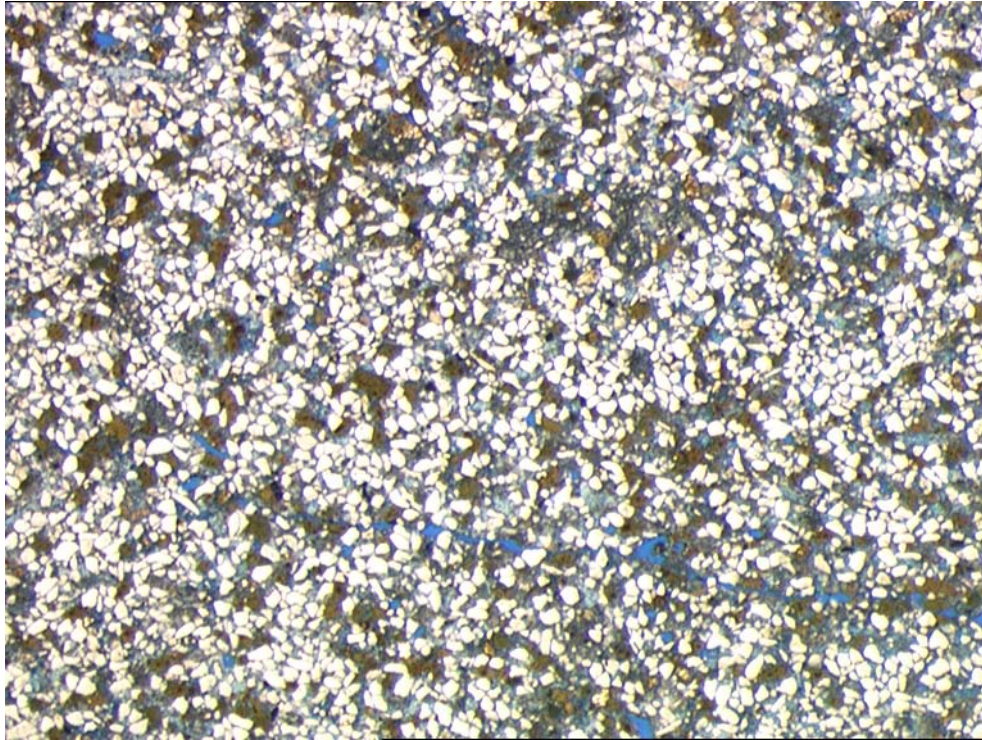
Dominated by well sorted, very fine to fine, angular to sub-angular quartz grains, with subordinate sub-rounded feldspar, glauconite and bioclastic and sparse mica grains, in a spar carbonate cement. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The bioclastic grains are predominantly siliceous, spicular (cylindrical and circular x-sections) fragments, with small benthonic foraminifera tests and some cellular, pyritized 'wood' fragments. Occasional finely micaceous mudstone clasts in the fabric.

Cementation

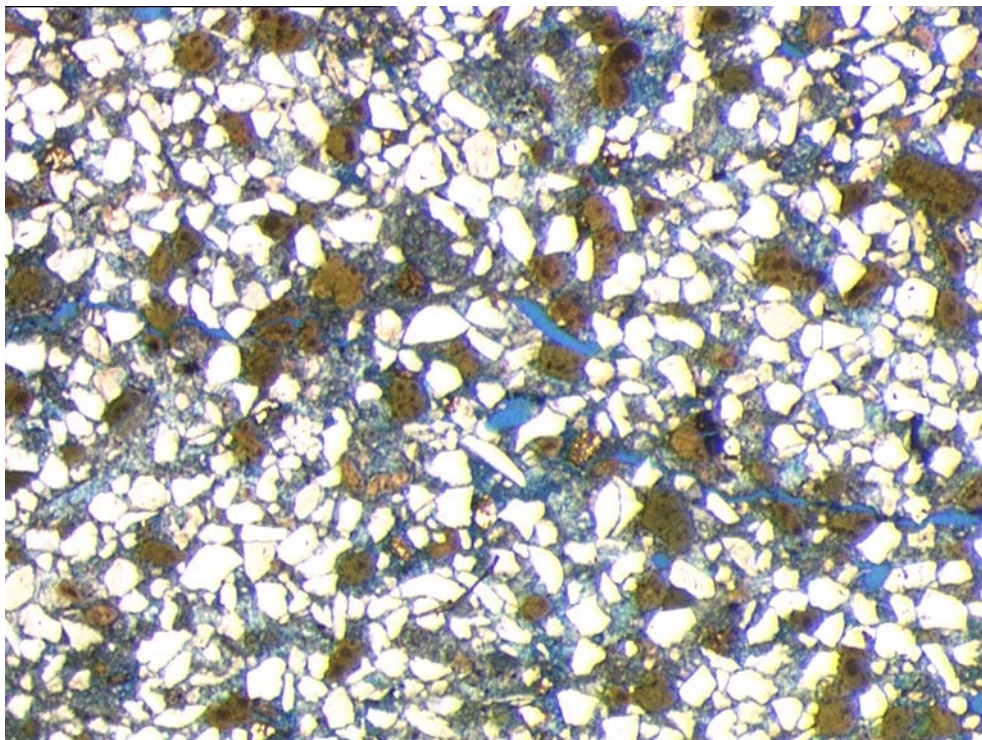
Pervasive ferroan spar carbonate.

Macroporosity

Sporadic open secondary dissolution pores -spicules.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

PQ004

Hand specimen

Calcareous and glauconitic sandstone

Thin section

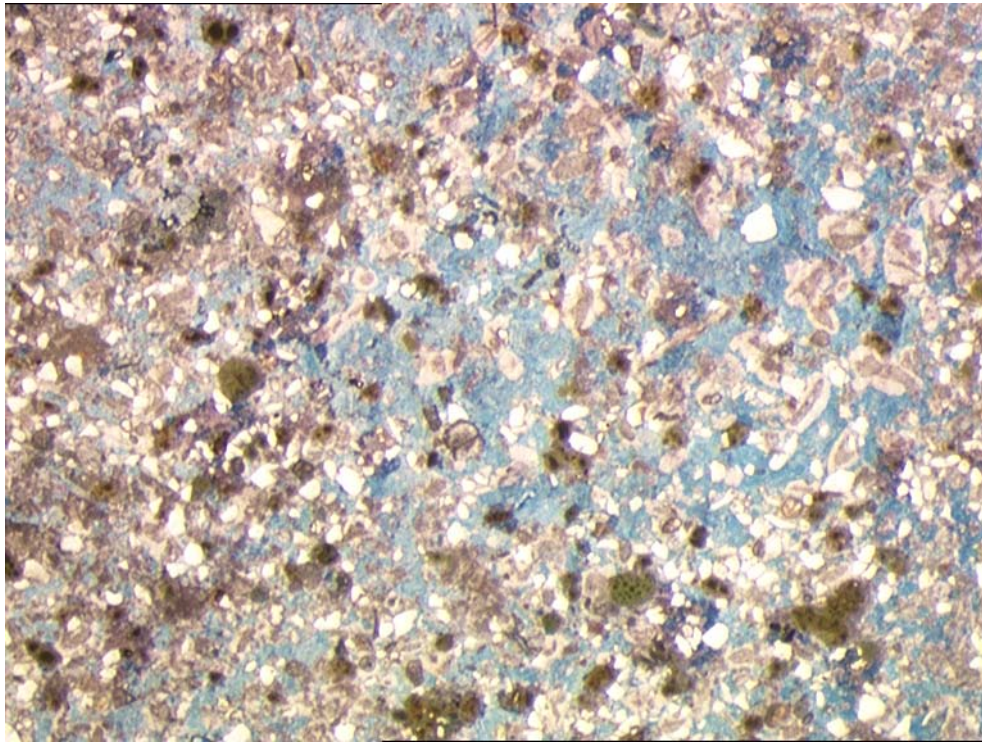
Dominated by well-sorted, very fine to fine, angular to sub-angular quartz grains, with subordinate sub-rounded feldspar, glauconite, bioclastic and sparse mica grains, in a spar carbonate cement. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The bioclastic grains are predominantly siliceous, spicular (cylindrical and circular x-sections) fragments and small benthonic foraminifera tests. Occasional finely micaceous mudstone clasts in the fabric.

Cementation

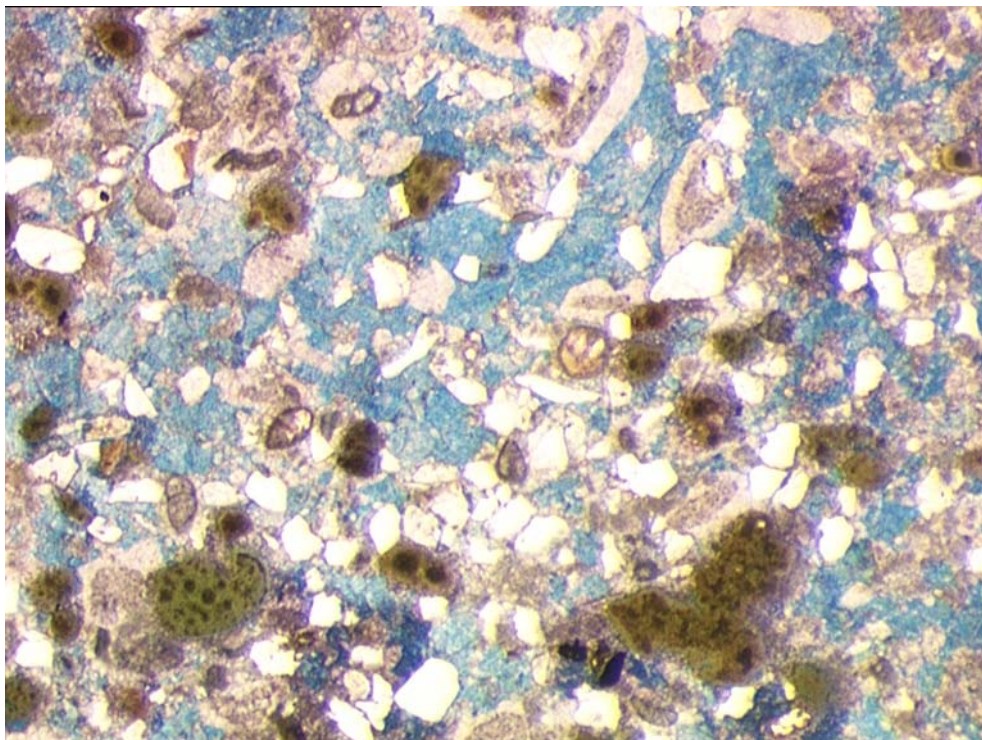
Pervasive ferroan spar carbonate.

Macroporosity

Sporadic open secondary dissolution pores -spicules.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

PQ008

Hand specimen

Glauconitic limestone

Thin section

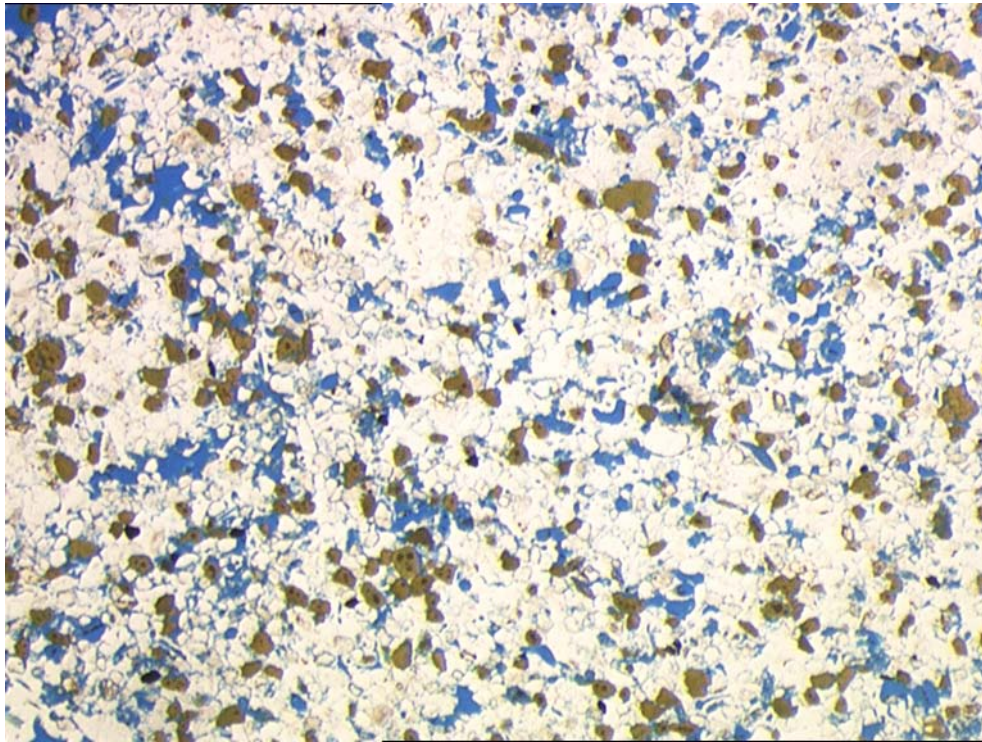
Abundant bioclastic grains, with sporadic well sorted, very fine to fine, angular to sub-angular quartz, sub-rounded feldspar, glauconite and sparse mica grains in a spar carbonate cement. The bioclastic grains principally include benthonic foraminifera tests and sporadic large, echinoid spine fragments. The non-ferroan bioclasts occasionally show extensive syntaxial overgrowths. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties.

Cementation

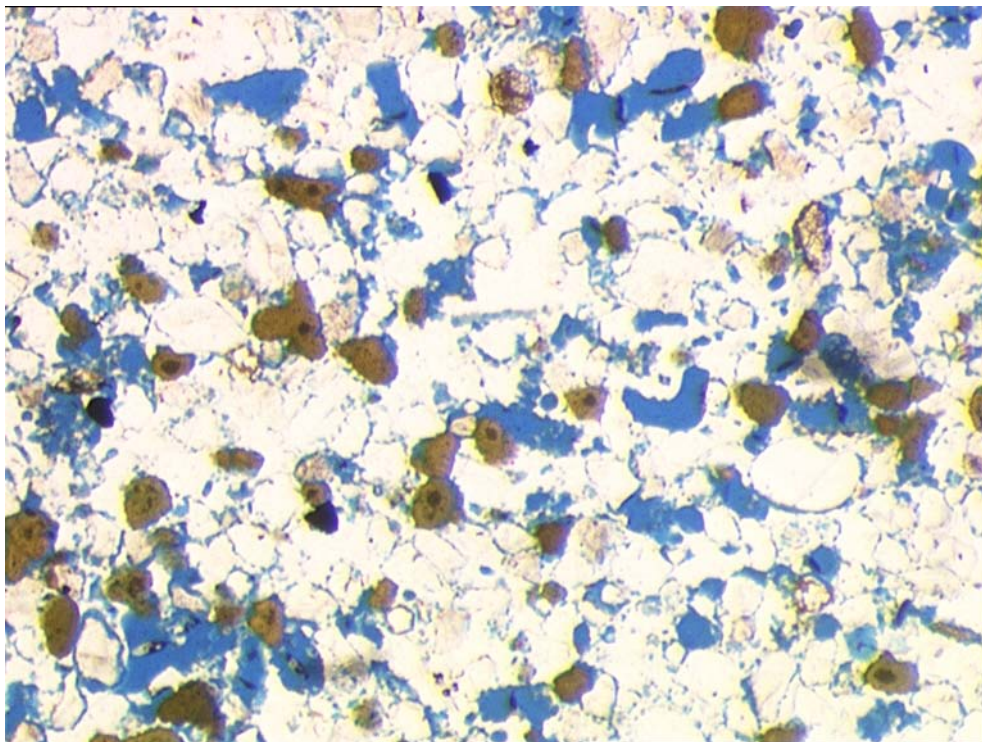
Pervasive, strongly ferroan, spar carbonate.

Macroporosity

None evident.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

AJN74

Hand specimen

Siliceous and glauconitic, sandstone

Thin section

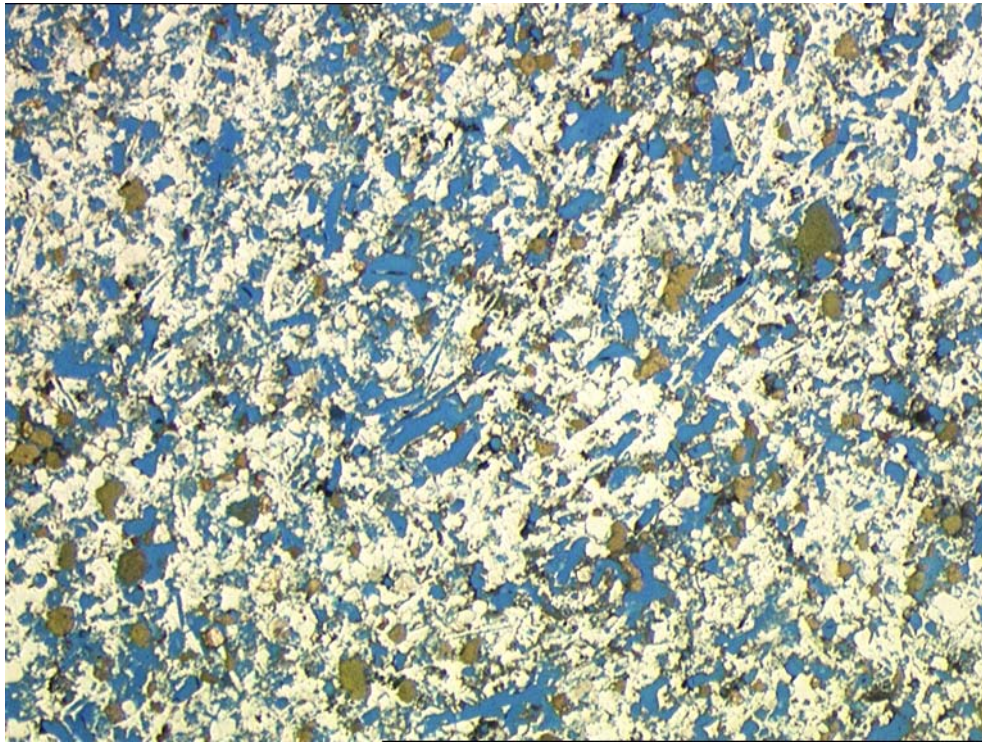
Dominated by well-sorted, fine, sub-rounded detrital, quartz grains, with subordinate feldspar and glauconite in a cryptocrystalline, chalcedonic, silica cement. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. Sparse muscovite mica grains are present. Sparse leached monaxon, spicular grains.

Cementation

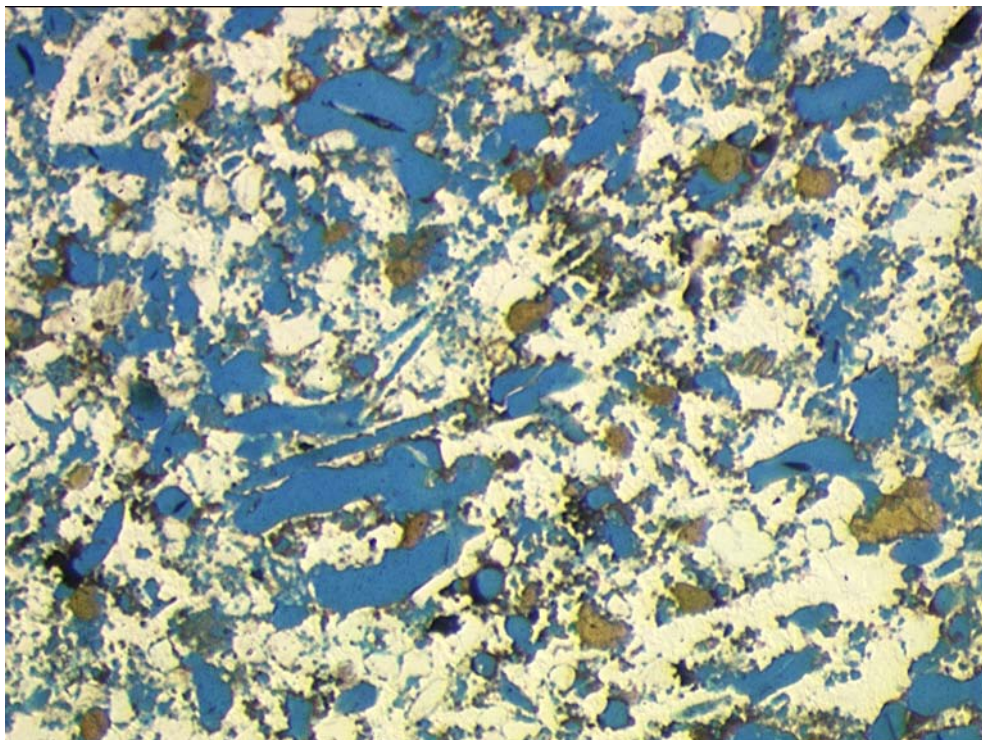
Pervasive, radiating, grain-coating, silica cement.

Macroporosity

Extensive intergranular porosity survives with a distinctive cellular fabric. Occasional large secondary pores after spicule dissolution?



(Field of view 8mm left to right)



(Field of view 3mm left to right)

AJN76

Hand specimen

Siliceous and glauconitic, sandstone

Thin section

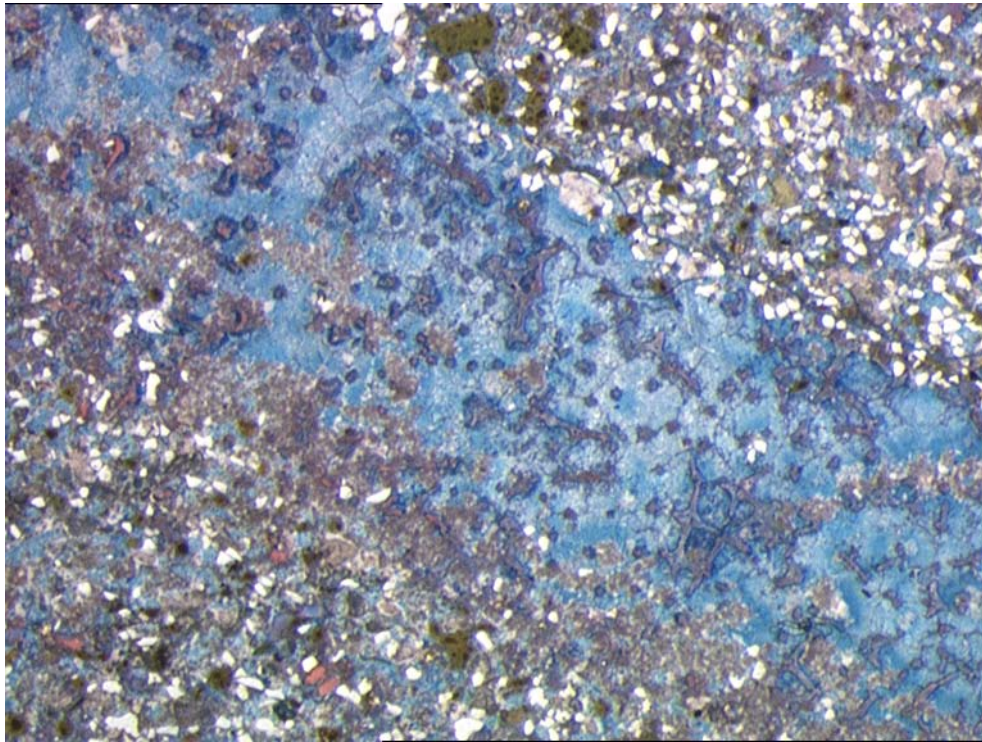
Dominated by leached, bioclasts (monaxon, spicular grains), with subordinate well-sorted, fine, sub-rounded, detrital quartz grains, sub-rounded feldspar and glauconite in a cryptocrystalline, chalcedonic, silica cement. Evidence of the spicular grains survive only as open leached, elongate, pore spaces. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. Sparse muscovite mica grains are also present.

Cementation

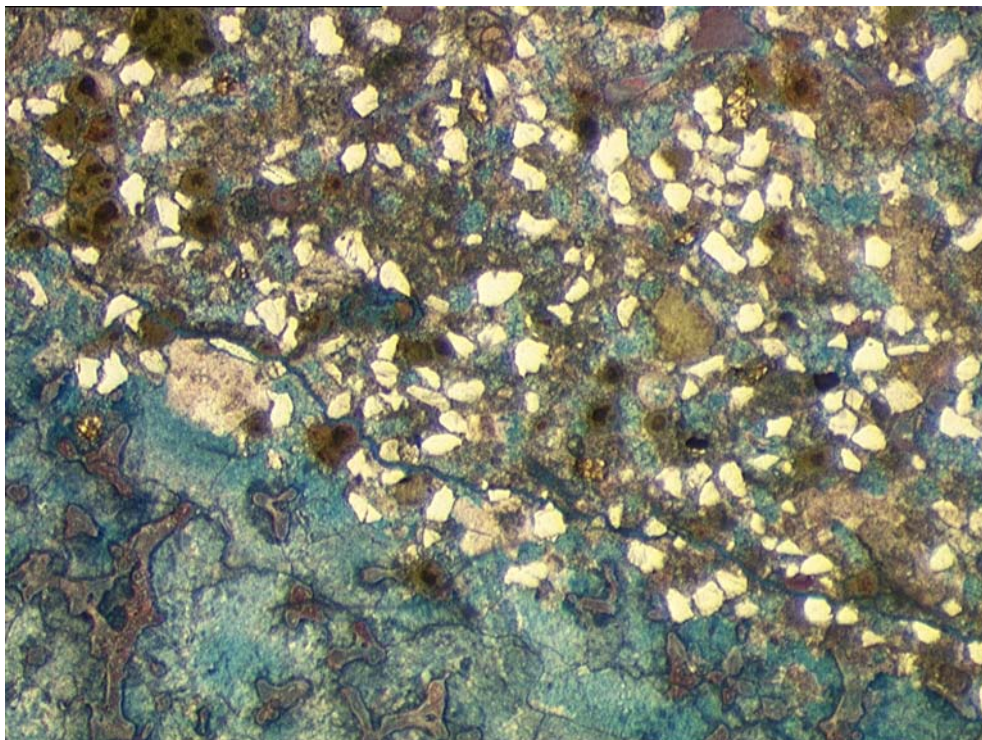
Pervasive, radiating, grain-coating, silica cement.

Macroporosity

Extensive secondary porosity after spicule dissolution. Finely cellular pores spaces common in the cryptocrystalline silicate cements.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

AJN78

Hand specimen

Siliciclastic and glauconitic, bioclastic limestone.

Thin section

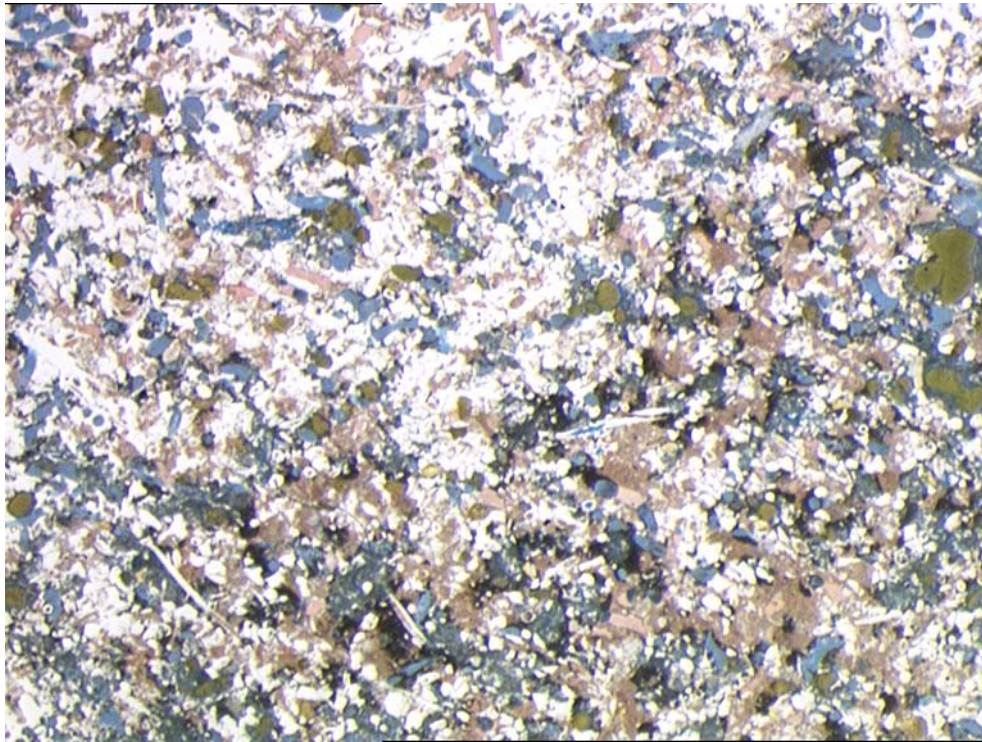
Dominated by well-sorted, very fine to fine, angular to sub-rounded, detrital, quartz grains, with subordinate feldspar and glauconite and abundant bioclastic debris in a pervasive spar-carbonate, cement. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. Sparse muscovite mica grains are present. The bioclastic grains include common triaxon and monaxon spicule debris, small foraminifera tests (benthonic and planktonic) and ?echinoid fragments, with syntaxial sparry overgrowths. The fabric is cross-cut by two coarse, ferroan spar-filled fractures.

Cementation

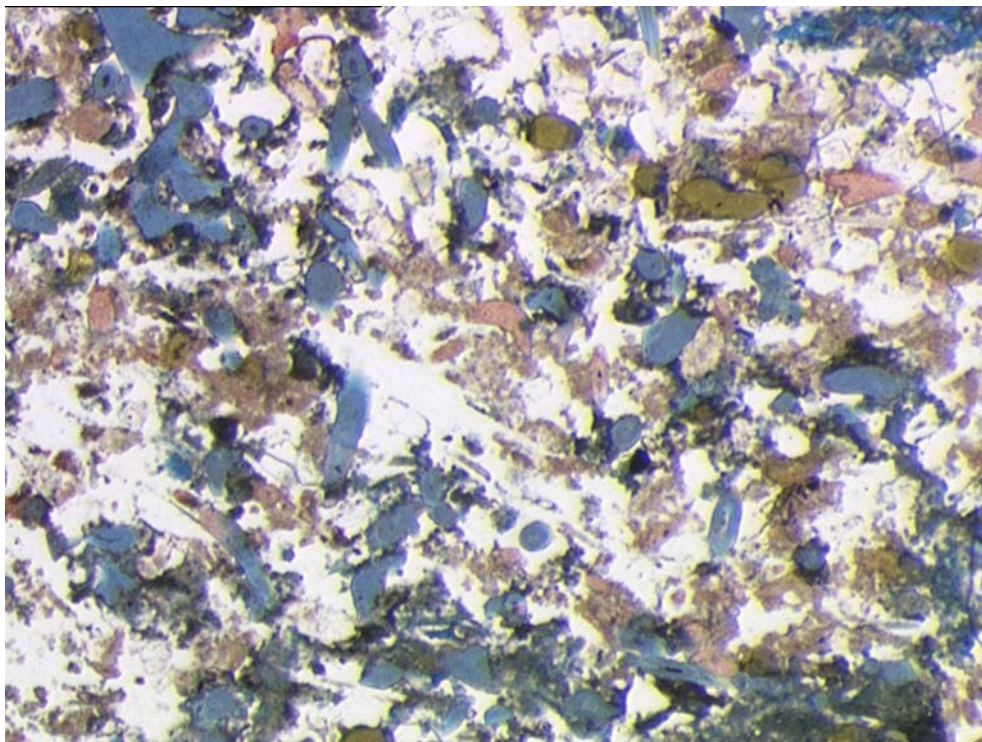
Pervasive, slightly ferroan to strongly ferroan spar carbonate.

Macroporosity

None evident.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

AJN80

Hand specimen

Siliceous and glauconitic, sandstone

Thin section

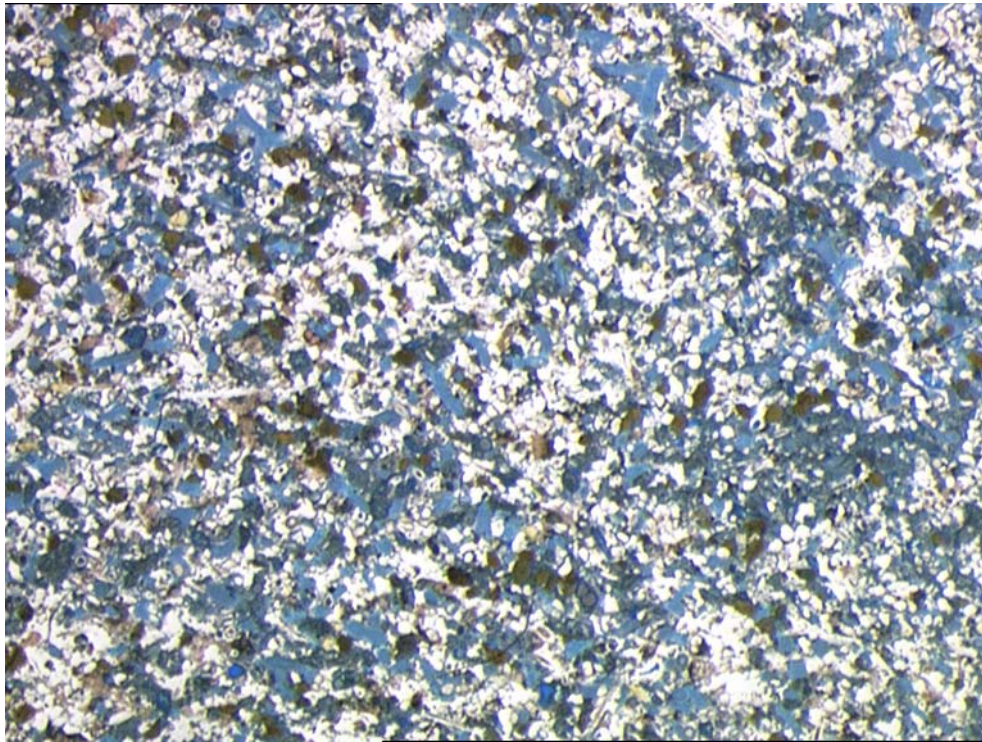
Dominated by leached, spicul fragments, well-sorted, fine, sub-rounded detrital, quartz grains, with subordinate feldspar and glauconite, in a cryptocrystalline, chalcedonic, and globular, silica cement. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. Sparse muscovite mica grains are present. Abundant monaxon and triaxon spicular grains survive only as leached remnants forming the rock framework. Fine silica-filled fractures crosscut the fabric.

Cementation

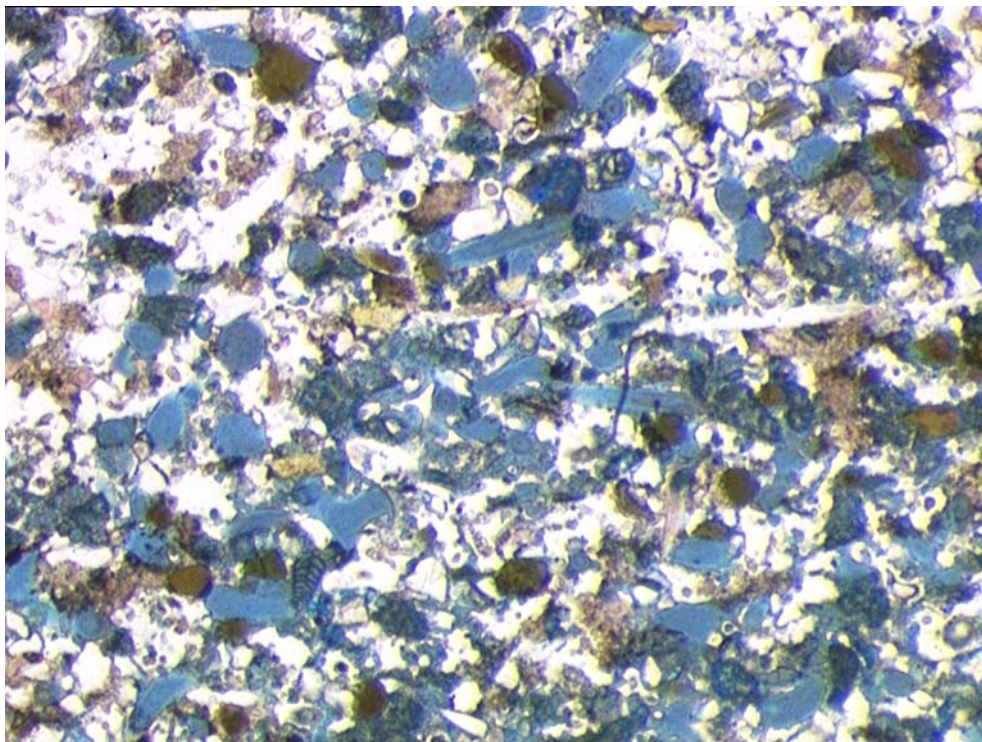
Pervasive, cryptocrystalline, chalcedonic, silica cement.

Macroporosity

Extensive intragranular porosity, after spicule dissolution, producing a distinctive cellular fabric.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

AJN83

Hand specimen

Siliceous and glauconitic, sandstone

Thin section

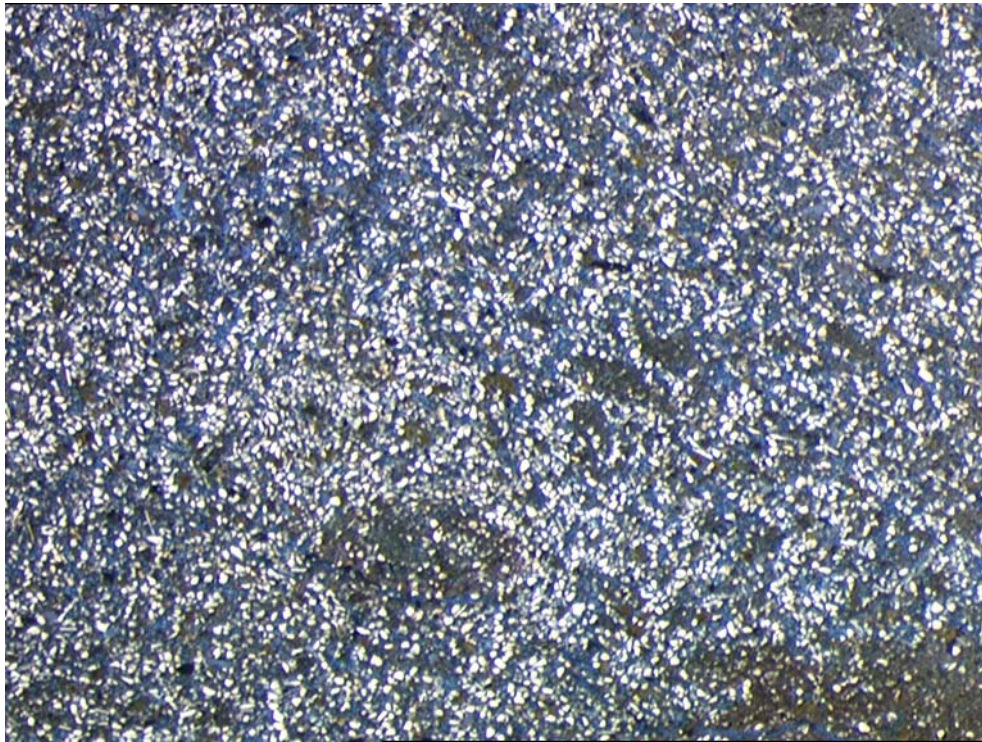
Dominated by leached, spicul fragments, well-sorted, fine, sub-rounded detrital, quartz grains, with subordinate feldspar and glauconite, in a cryptocrystalline, chalcedonic, and globular, silica cement. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. Sparse muscovite mica grains are present. Abundant monaxon and triaxon spicular grains survive only as leached remnants forming the rock framework.

Cementation

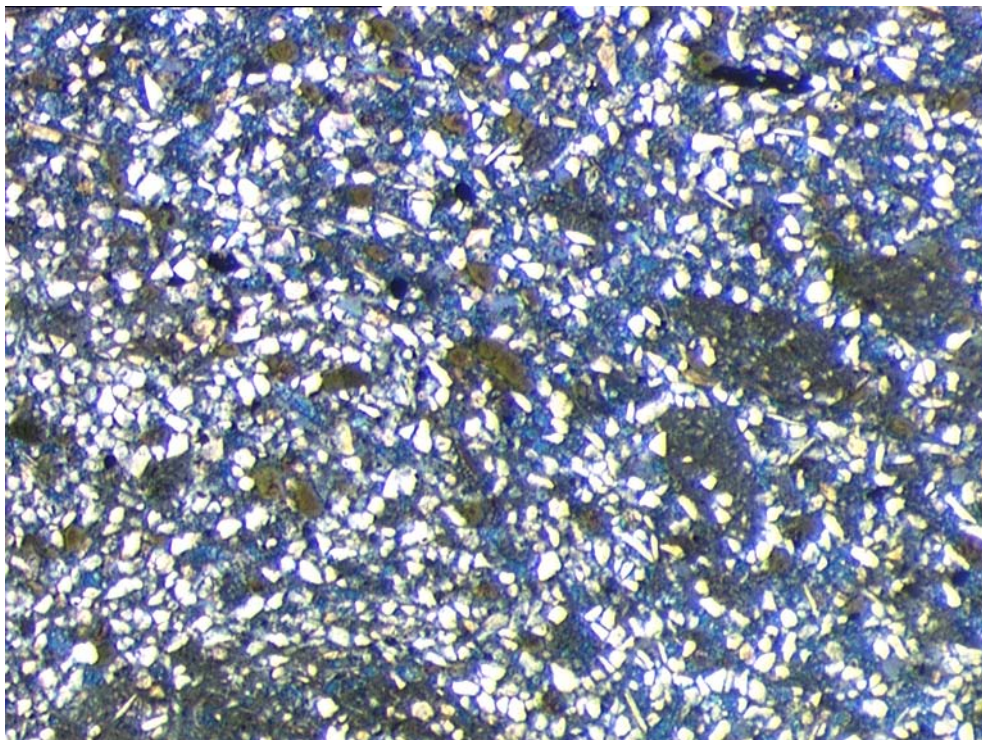
Pervasive, cryptocrystalline, chalcedonic, silica cement.

Macroporosity

Extensive intragranular porosity, after spicule dissolution, producing a distinctive cellular fabric.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

WMD1114

Hand specimen

Siliciclastic and glauconitic, bioclastic limestone.

Thin section

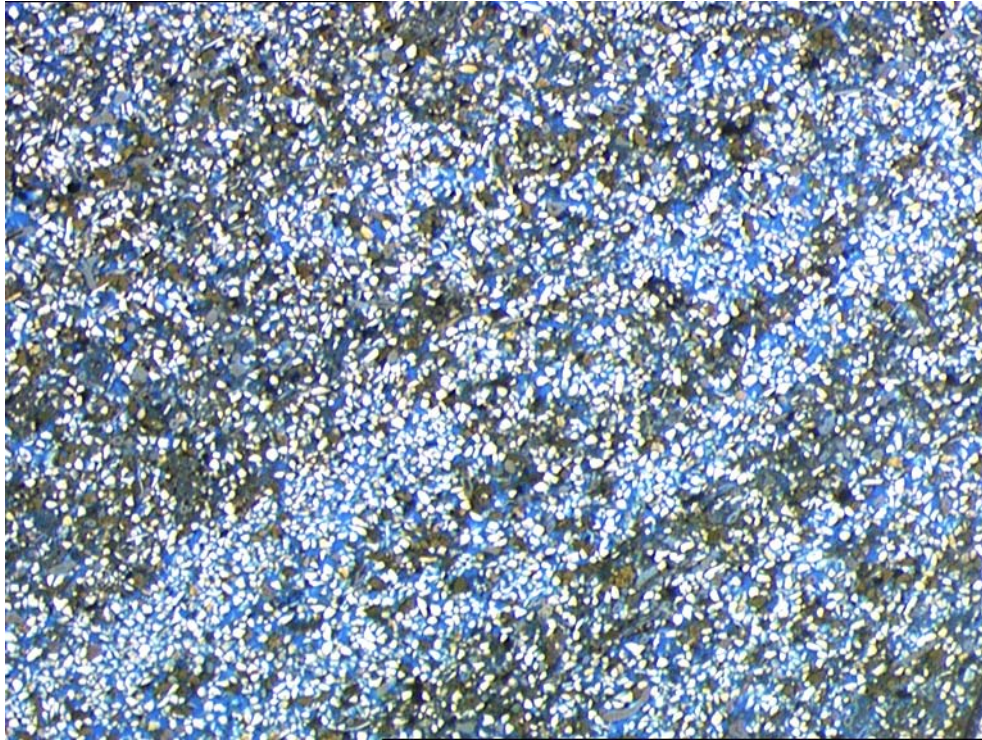
Dominated by well-sorted, very fine, angular, detrital, quartz grains, with subordinate feldspar, glauconite, muscovite mica grains and abundant spar replaced bioclastic debris, in a muddy, micritic matrix (bioturbated?). The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The bioclastic grains are dominantly strongly ferroan, spar-replaced calcispheres, with sporadic, leached monaxon and triaxon spicules.

Cementation

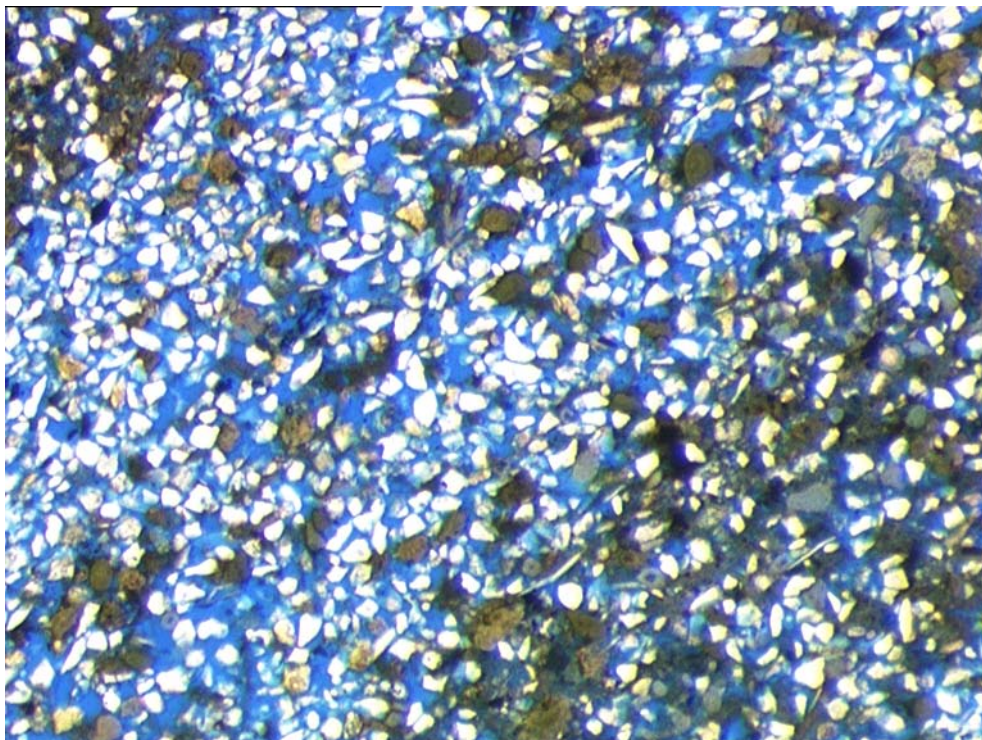
Patchy, micritic, muddy matrix.

Macroporosity

Secondary pores are common after spicule dissolution..



(Field of view 8mm left to right)



(Field of view 3mm left to right)

WMD1115

Hand specimen

Siliciclastic and glauconitic, bioclastic limestone.

Thin section

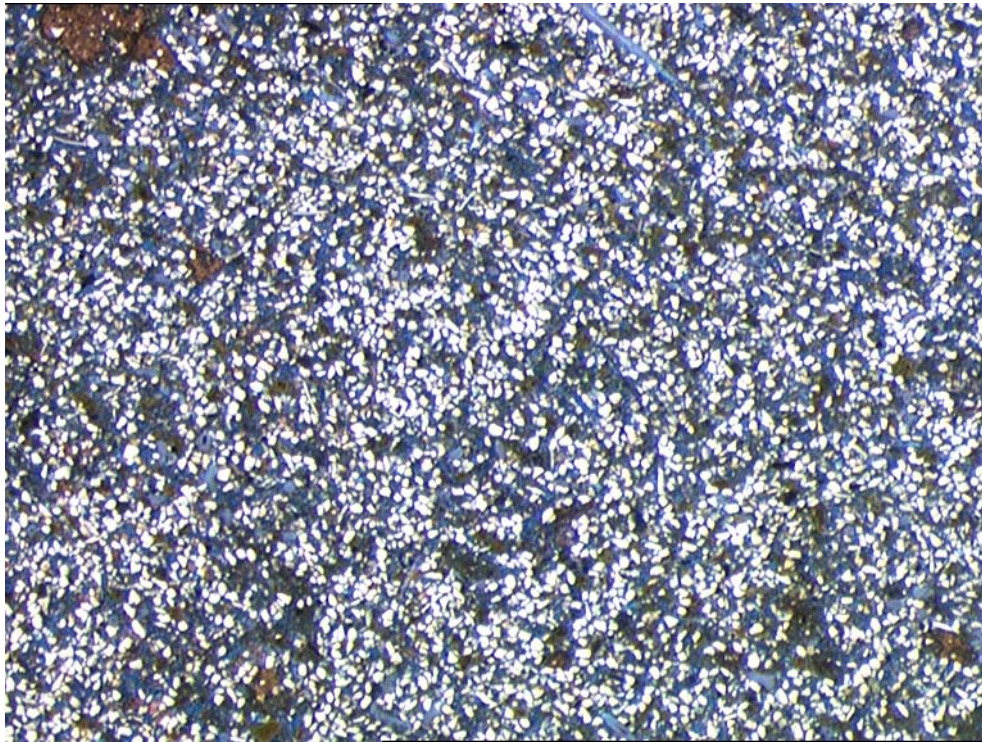
Dominated by well-sorted, very fine, angular, detrital, quartz grains, with subordinate feldspar, glauconite, unoriented muscovite mica grains and common bioclastic debris. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The bioclastic grains are dominantly leached monaxon and triaxon spicules with a single gastropod test.

Cementation

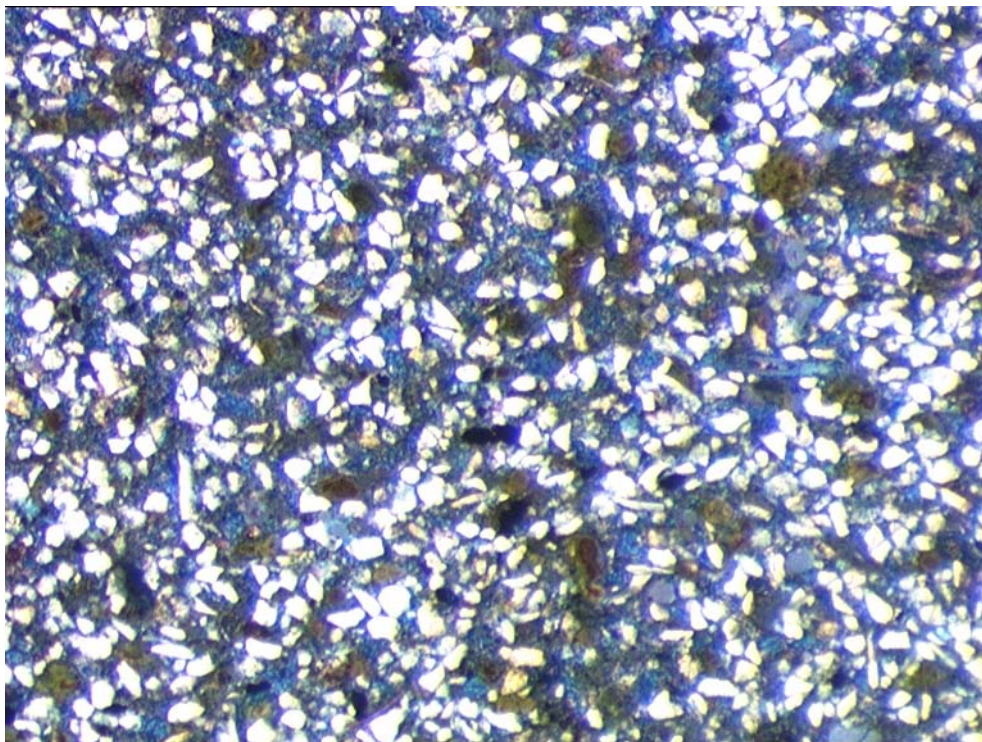
Patchy, micritic, muddy patches and laminae.

Macroporosity

Good, open, intergranular primary porosity, enhanced by secondary spicule dissolution pores.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

WMD1116

Hand specimen

Siliciclastic and glauconitic, bioclastic limestone.

Thin section

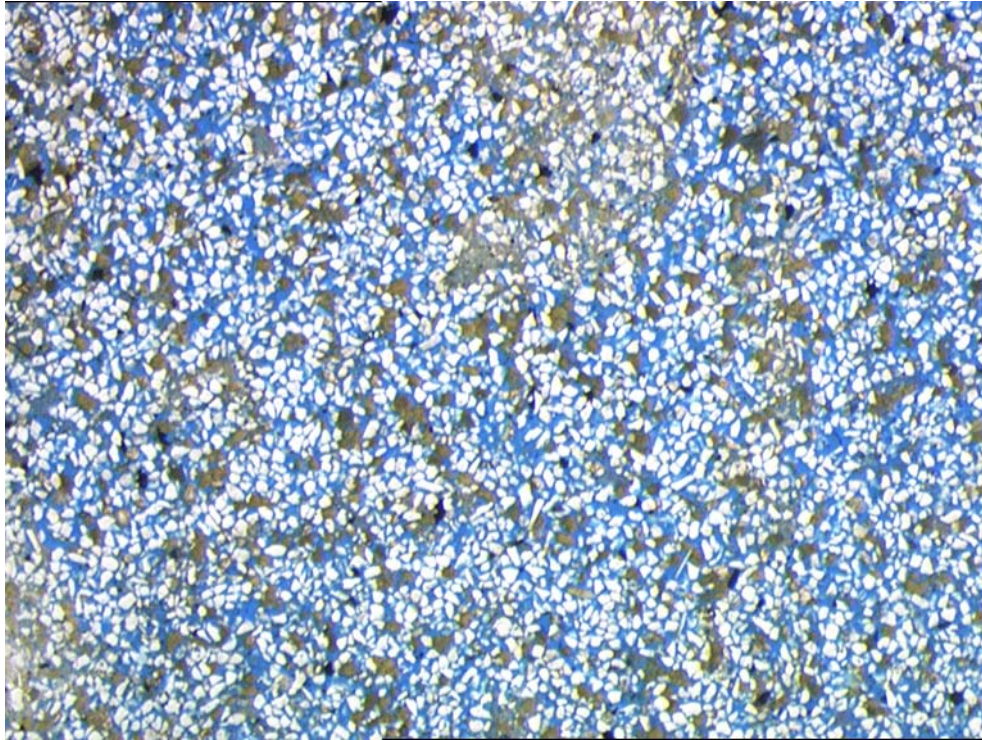
Dominated by well-sorted, very fine, angular, detrital, quartz grains, with subordinate feldspar, glauconite, unoriented muscovite mica grains and common bioclastic debris in a ?bioturbated, spar calcite cemented fabric. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The bioclastic grains are dominantly leached monaxon and triaxon spicules with common foraminifera tests.

Cementation

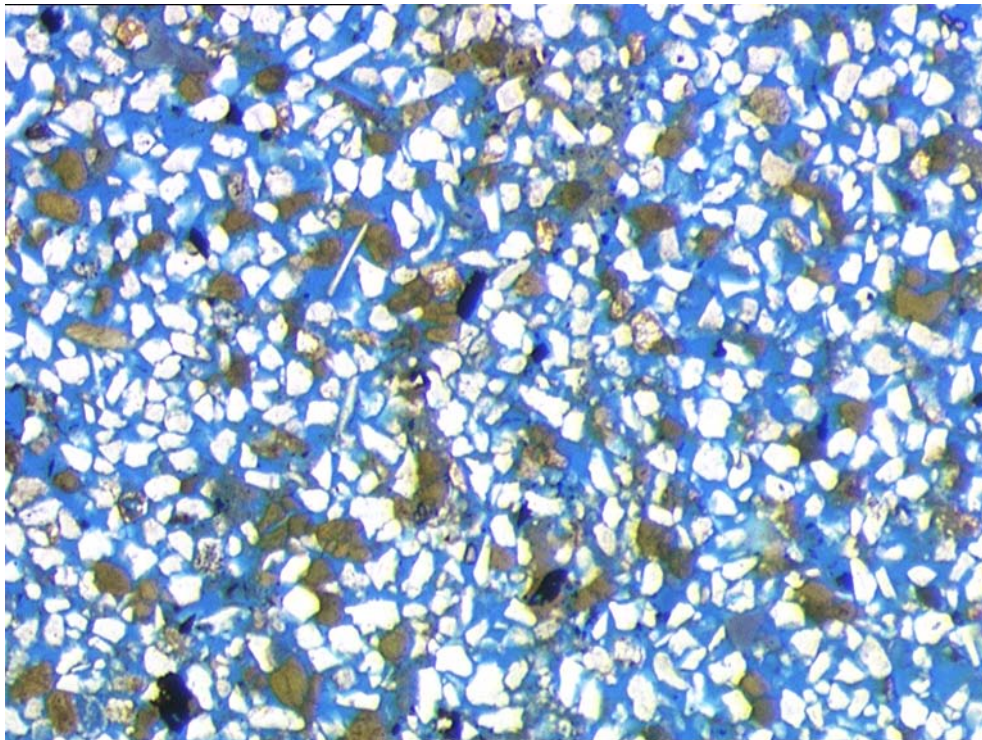
Strongly ferroan spar carbonate, with sporadic muddy patches.

Macroporosity

Sparse secondary spicule dissolution pores.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

WMD1117

Hand specimen

Siliciclastic and glauconitic sandstone.

Thin section

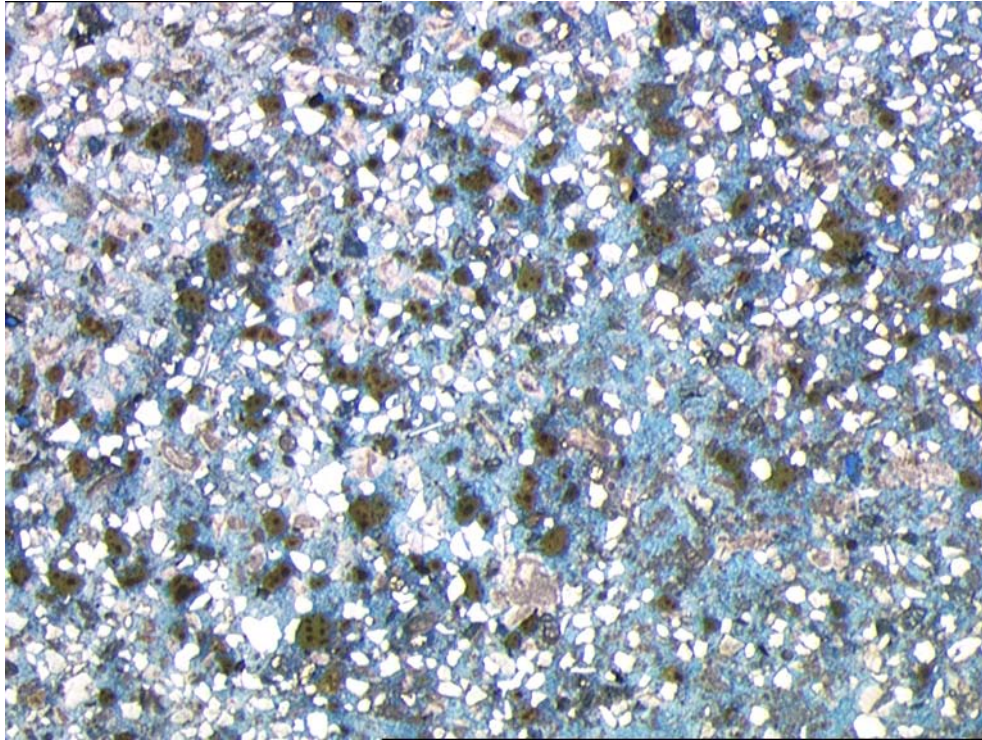
Dominated by well-sorted, very fine, angular, detrital, quartz grains, with subordinate feldspar, glauconite, unoriented muscovite mica grains and common bioclastic debris forming an open, weakly cemented fabric. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The bioclastic grains are dominantly leached monaxon and triaxon spicules.

Cementation

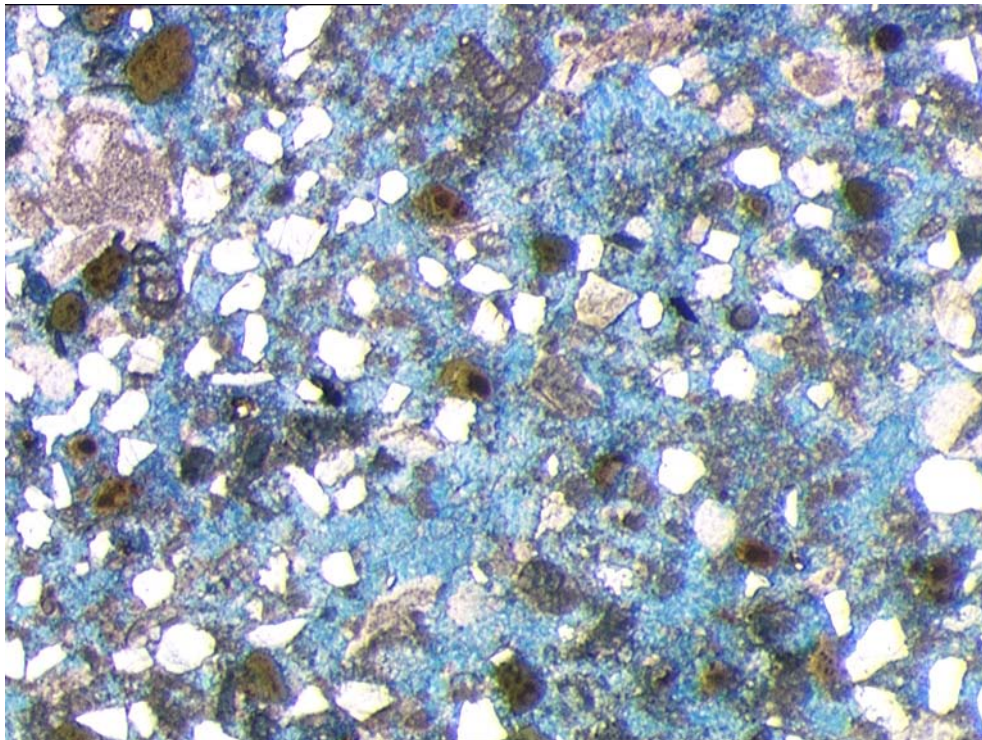
Sporadic patches (?burrowfills) of muddy matrix.

Macroporosity

Good, open, intergranular primary porosity.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

WMD1118

Hand specimen

Siliciclastic and glauconitic, bioclastic limestone

Thin section

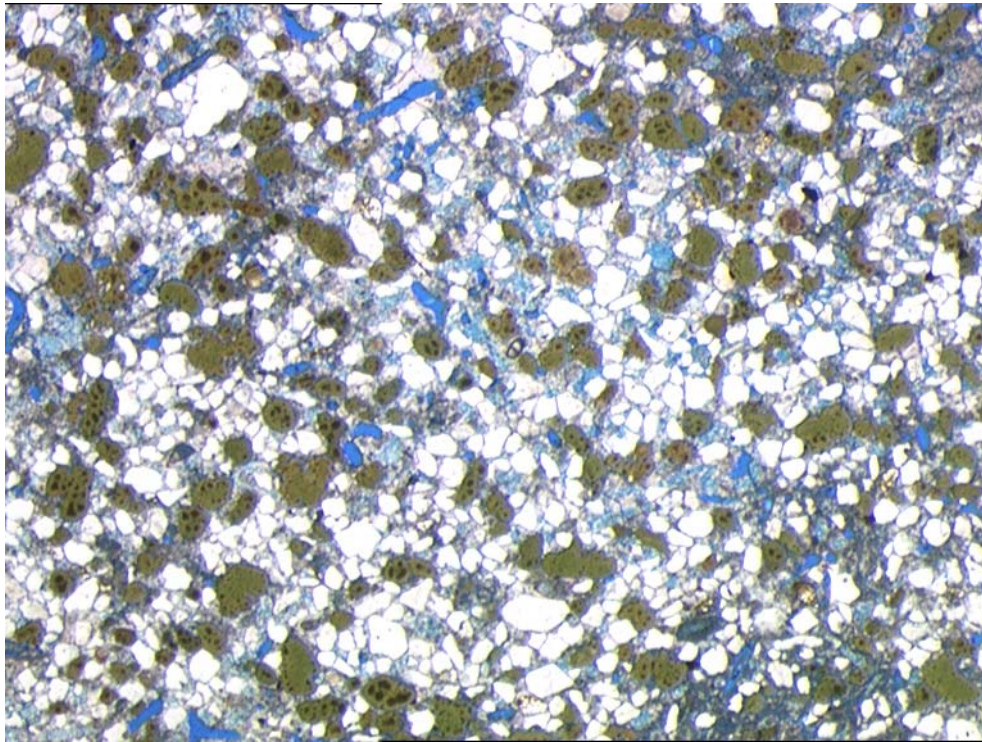
Dominated by moderately-sorted, fine to medium, angular to sub-rounded quartz grains, with subordinate feldspar, glauconite, bioclasts and sparse mica grains, floating in a spar carbonate cement. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The sparse bioclastic grains include abundant non-ferroan, micritized carbonate fragments, with a distinct syntaxial overgrowth cement, and small, benthonic foraminifera tests. The glauconite show a simple compositional zonation, with a obvious darker core.

Cementation

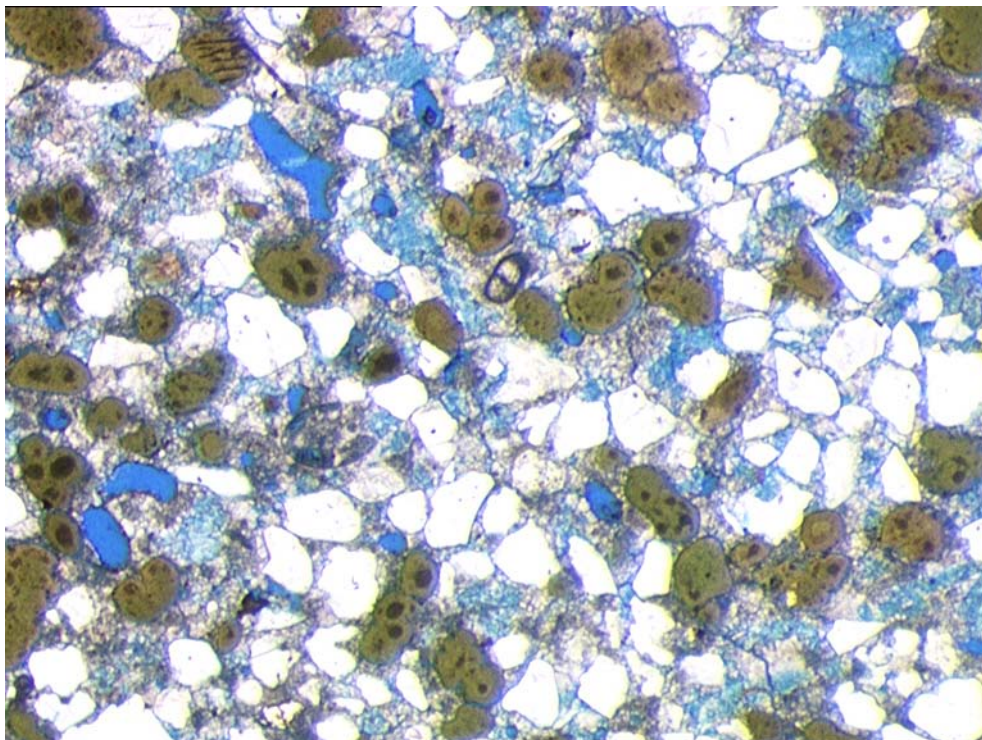
Pervasive ferroan spar carbonate.

Macroporosity

Sporadic open secondary dissolution pores.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

WMD1119

Hand specimen

Siliciclastic and glauconitic, bioclastic limestone

Thin section

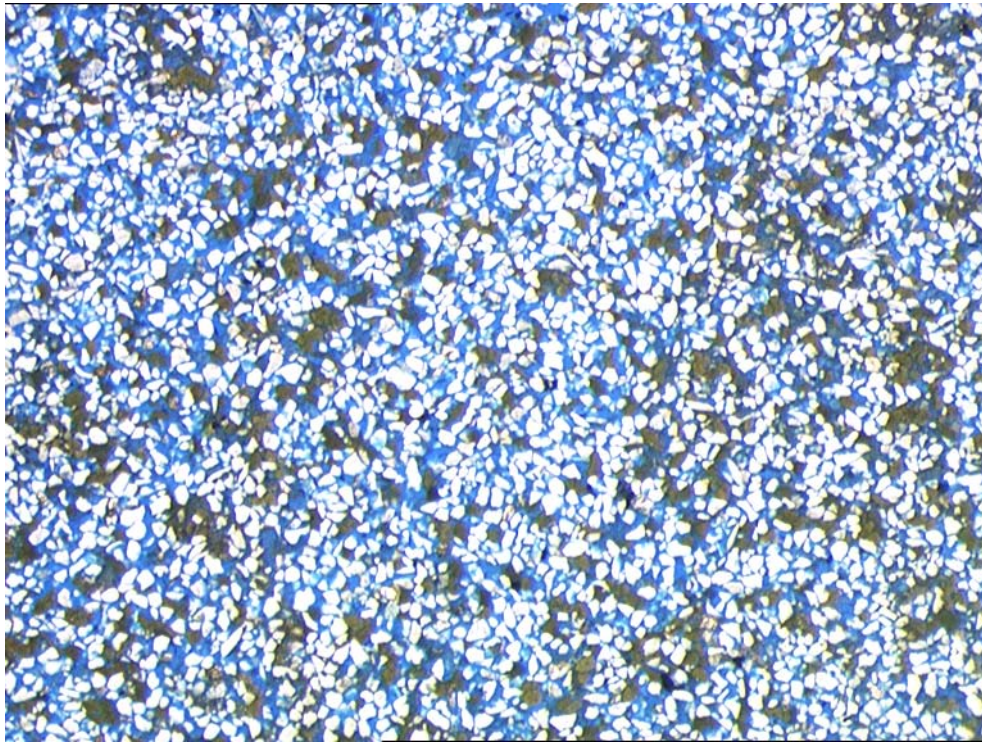
Dominated by moderately-sorted, fine to medium, angular to sub-rounded quartz grains and glauconite with subordinate feldspar, bioclasts and sparse mica grains in a carbonate cement. Patches of finer micritic carbonate are common. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both potassic and sodic varieties. The sparse bioclastic grains include bivalve fragments, benthonic foraminifera tests calcispheres and spicules. The abundant glauconite grains show a simple compositional zonation, with a obvious darker core.

Cementation

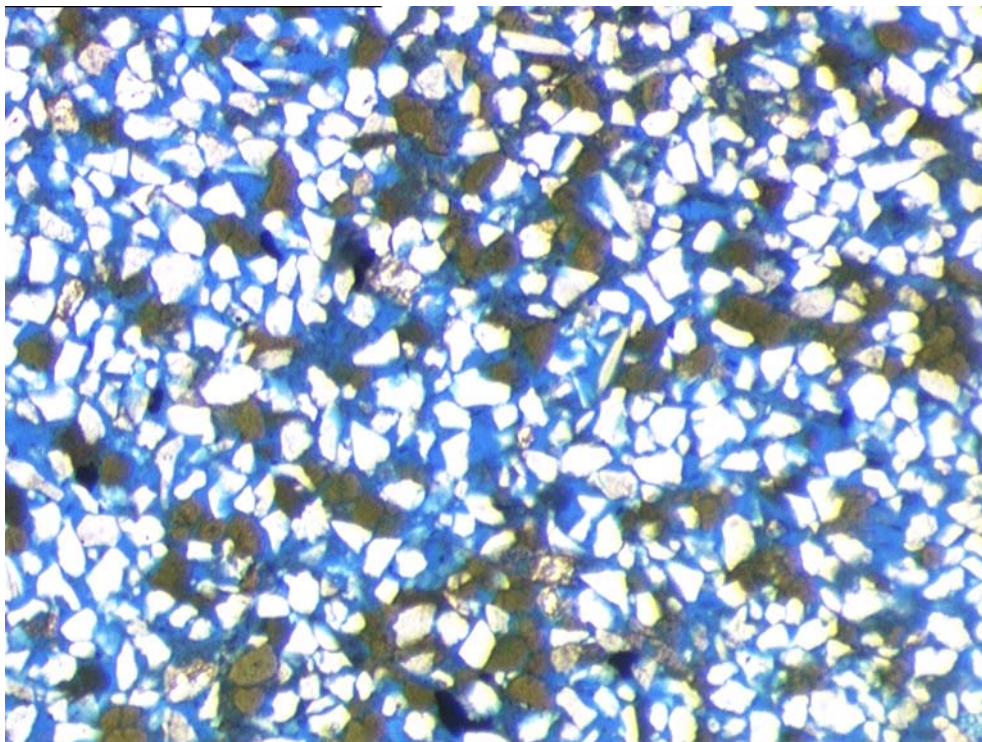
Pervasive ferroan spar carbonate with patches of non-ferroan micrite.

Macroporosity

Sporadic open secondary dissolution pores.



(Field of view 8mm left to right)



(Field of view 3mm left to right)

WMD1120

Hand specimen

Siliciclastic and glauconitic, sandstone.

Thin section

Dominated by well-sorted, very fine, angular, detrital, quartz grains with subordinate feldspar, glauconite, unoriented muscovite mica grains and common bioclastic debris forming an open, porous framework. The quartz grains are dominated by monocrystalline varieties. The feldspar grains include both sodic and potassic varieties. The sparse bioclastic grains include non-ferroan, benthonic foraminifera tests and bored and abraded bivalve fragments..

Cementation

Weakly cemented at grain contacts with sporadic muddy patches.

Macroporosity

Good, open, primary intergranular porosity.