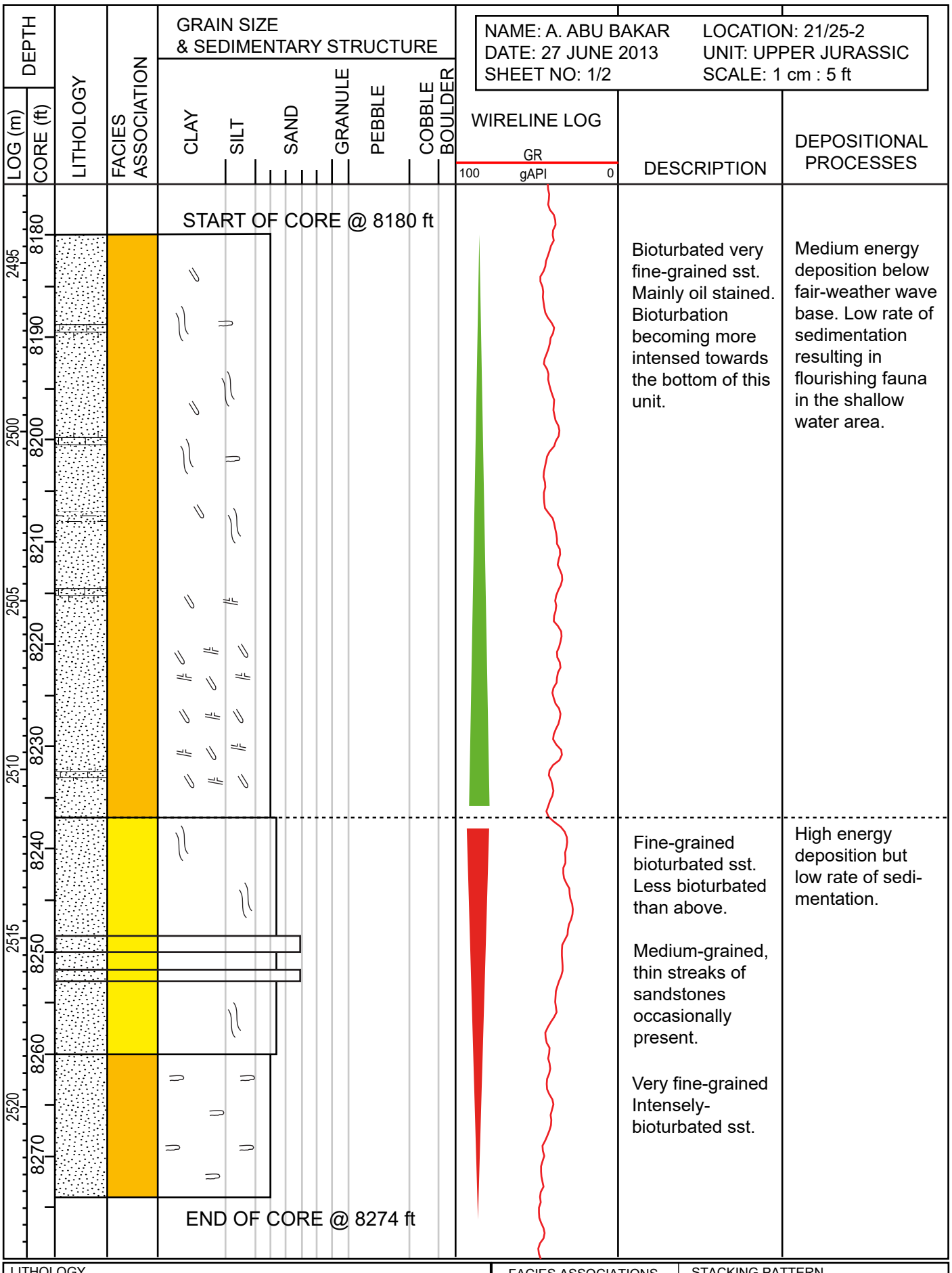
APPENDIX 2: CORE DESCRIPTION

This document contains core description from wells used in this study.

The list of wells are as follows:

NAME: A. ABU BAKAR
DATE: 27 JUNE 2013
SHEET NO: 1/2

LOCATION: 21/25-2
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU BAKAR
DATE: 27 JUNE 2013
SHEET NO: 2/2
LOCATION: 21/25-2
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

DEPTH
LOG (m) / CORE (ft)
LITHOLOGY
FACIES ASSOCIATION
GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY | SILT | SAND | GRANULE | PEBBLE | COBBLE | BOULDER
WIRELINE LOG
GR
100 gAPI 0
DESCRIPTION
DEPOSITIONAL PROCESS

START OF CORE @ 8313 ft

LOG (m)	CORE (ft)	DESCRIPTION	DEPOSITIONAL PROCESS
2540	8320	Fractures. Broken-up cores. Oil stained.	Medium energy deposition below fair-weather wave base. Slow rate of deposition allowing fauna to fluorish.
2545	8340	Calcite cemented.	
2550	8360	Badly broken with hints of bioturbation in broken cores.	
2555	8380	Massive sand-stones with cross beds and pebbles. Broken up cores.	High energy, uni-directional, rapid deposition.
2560	8390	TOP TRIASSIC	
2565	8400	Brown siltstones. High angle dips. Massive brown sandstones with pebbles. Red siltstones interbedded with grey sandy siltstones.	High energy deposition.
	8410		

END OF CORE @ 8413 ft

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU BAKAR
DATE: 27 JUNE 2013
SHEET NO: 1/1
LOCATION: 22/25-8
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

DEPTH
LOG (m) / CORE (ft)
LITHOLOGY
FACIES ASSOCIATION
GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY | SILT | SAND | GRANULE | PEBBLE | COBBLE | BOULDER
WIRELINE LOG
GR
100 gAPI 0
DESCRIPTION
DEPOSITIONAL PROCESS

START OF CORE @ 10735 ft

DESCRIPTION	DEPOSITIONAL PROCESS
Dark grey silty clay. Intense bioturbation	Low energy and low rate of deposition.
Bioturbated sandstones and shales.	Medium energy deposition below fair-weather wave base. Low rate of deposition allowing fauna to fluorish.
Oil stained sandstones	
Broken up cores.	
Broken up cores.	
Oil stained, highly bioturbated sandstones.	
Highly bioturbated.	
Highly bioturbated sansdstones with occasional shell fragments.	

END OF CORE @ 11005 ft

LITHOLOGY

siliciclastic sediments
- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates
- limestone
- dolomite
- sandy limestone

Core condition:
- Missing Core
- Rubble

others
- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS
- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN
- Aggrading/Backstepping
- Prograding

BOUNDARIES
- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES
- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:
- azimuth
- trend

TRACE FOSSILS
- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A ABU BAKAR
DATE: 13 Feb 2013
SHEET NO: 1/1

LOCATION: 22/12A-3
UNIT: UPPER JURASSIC
SCALE: 1 cm : 2 m

DEPTH
LOG (m)
CORE (m)

LITHOLOGY

FACIES ASSOCIATION

GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY | SILT | SAND | GRANULE | PEBBLE | COBBLE | BOULDER

WIRELINE LOG
GR
100 gAPI 0

DESCRIPTION

DEPOSITIONAL PROCESS

START OF CORE @ 3636 m

DESCRIPTION	DEPOSITIONAL PROCESS
Grey, pebbly in parts. Bioturbated, poorly sorted.	High energy deposits initially but followed by slow depositional rate that allowed preservation of burrows.
Coarser grains in cross beds	
Less clay lining in burrows upwards.	Rate of bioturbation is higher than rate of deposition.
Shell layer.	
Consists of dark grey concretion with brown halo.	
Shell fragments	
Yellow grey sandstones less clay linings in burrows upwards. Generally reduced clay lining around burrows upwards.	Rate of bioturbation is higher than rate of deposition.
Yellowish, massive rare burrows.	High energy initial deposition followed by slower rate allowing burrows to be developed and preserved.
Large cross beds with coaly fragments.	High energy. Unidirectional flow. Close to vegetated area.
Core is fragmented.	
Large cross beds with coaly fragments.	
Silty sands, abundant burrows.	Lower rate of deposition allowing bioturbation to be preserved.
Coarse-fine couplets in large cross beds.	High energy. Unidirectional flow. Close to vegetated area. Influenced by tidal process?
Coaly materials in large cross beds.	
Grey sandstones. Bioturbated.	High energy initial deposition followed by quiet period in order for burrows to be preserved.
Brown silty sandstones and dark grey shales. Occasional siderite nodules.	Relatively low energy. Slow rate of deposition allowing burrows to be preserved.
Shell layer.	Close to vegetated area but have marine influence.
Dark grey siltstones and sandstones. Angular contact.	
Siltstones and coal.	Paleosol
Buff sandstones. Large cross beds.	High energy deposition above fair-weather wave base.
Yellowish grey, with micro-hummocky and wavy beddings.	Medium energy below fair-weather wave base.
Dark grey silty sandstones.	
Core broken up	Low energy close to vegetated area. with paleosols.
Mottled, bleached.	Medium energy deposition close to vegetated area.
Brown silty sandstones, mottled, bleached. interbedded with black shales.	
Core broken up	
Cross laminated with crypto-burrows.	

END OF CORE @ 3758 m

LITHOLOGY

siliciclastic sediments
- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates
- limestone
- dolomite
- sandy limestone

Core condition:
- Missing Core
- Rubble

others
- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS
- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN
- Aggrading/Backstepping
- Prograding

BOUNDARIES
- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

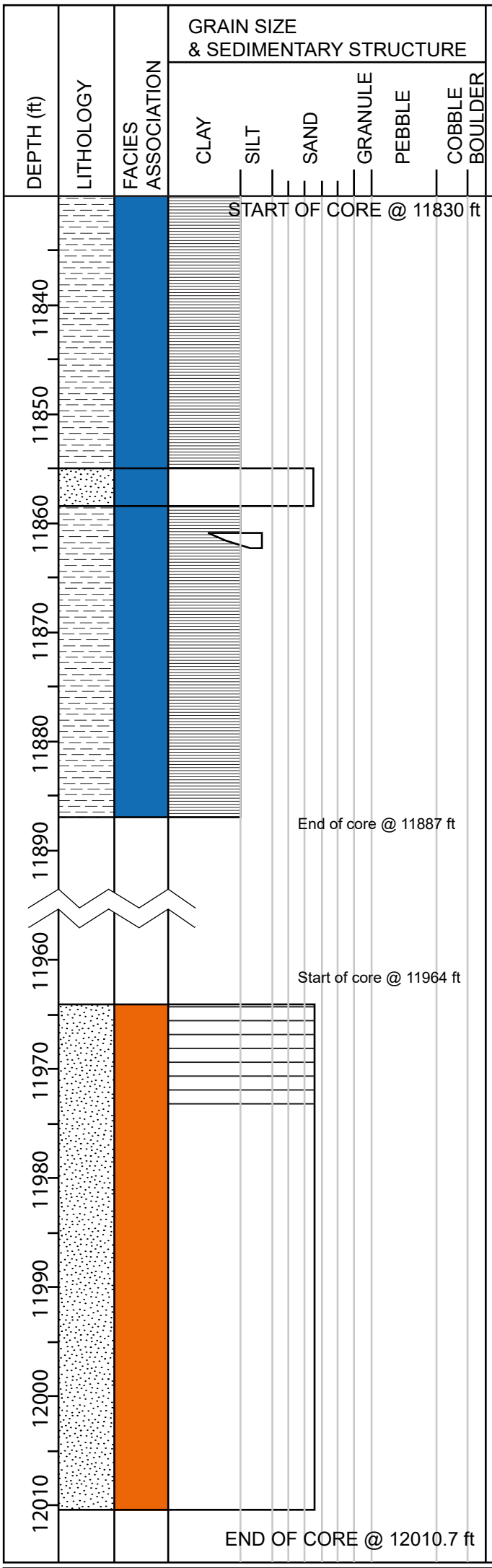
SEDIMENTARY STRUCTURES
- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal graded bedding
- reversed graded bedding
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:
- azimuth
- trend

TRACE FOSSILS
- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU-BAKAR
DATE: 27 MAY 2014
SHEET NO: 1/1
LOCATION: 22/13A-1
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft



DESCRIPTION	DEPOSITIONAL PROCESSES
Black shales laminated with thin silty, very fine sandstones. Occasional belemnite fossils.	Low energy sedimentation dominated by settling of very fine sediments. Occasional coarse lenses transported by turbidity current.
Massive silty sandstones. no apparent sedimentary structures.	
Laminated sandstones.	High energy sedimentation. High density turbulent flow.
Massive sandstones.	High energy sedimentation. Density or turbulent flow.

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A ABU-BAKAR
DATE: 1 AUG 2013
SHEET NO: 1/2
LOCATION: 22/21-7
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

GRAIN SIZE & SEDIMENTARY STRUCTURE: CLAY | SILT | SAND | GRANULE | PEBBLE | COBBLE | BOULDER

WIRELINE LOG: GR, 150 gAPI 0

DEPTH LOG (m)	DEPTH CORE (ft)	LITHOLOGY	FACIES ASSOCIATION	DESCRIPTION	DEPOSITIONAL PROCESS
				START OF CORE @ 14640 ft	
4470	14640			Black silty shales. generally laminated, occasional lenses of fine sands.	Deposition of fine grained material by suspension settling. Occasional input of silty materials by storm.
4475	14660			Cemented	
4480	14680			Laminated sandstones	High energy deposition in turbulent flow..
	14690			Ripple laminated sandstones with parallel laminations.	High energy deposition in turbulent flow.
4485	14700			Massive sandstones.	High energy deposition by turbulent or density flow.
4490	14710			Ripple laminated sandstones.	
	14720			END OF CORE @ 14718 ft	

NAME: A ABU-BAKAR
DATE: 1 AUG 2013
SHEET NO: 2/2
LOCATION: 22/21-7
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

GRAIN SIZE & SEDIMENTARY STRUCTURE: CLAY | SILT | SAND | GRANULE | PEBBLE | COBBLE | BOULDER

WIRELINE LOG: GR, 150 gAPI 0

DEPTH LOG (m)	DEPTH CORE (ft)	LITHOLOGY	ENVIRONMENT OF DEPOSITION	DESCRIPTION	DEPOSITIONAL PROCESS
				START OF CORE @ 14750 ft	
4502	14750			Black silty shales. generally laminated.	Deposition of fine grain material by suspension setlling.
4504	14760			Silty sandstones. generally laminated.	High energy deposition in turbulent or density flow.
4506	14770			Massive sandstones	
4508	14780			Laminated shales	
4510	14790			Massive sandstones	High energy deposition in turbulent or density flow.
4512	14800			Bioturbated, ripple laminated sandstones.	High energy deposition in turbulent or density flow.
4514	14810			Massive claystone with occasional lenticular lamina-tions.	Deposition of fine grain material by suspension setlling. Occasional input of coarser grain material during storm.
4516	14820			Cemented	
4518	14830			Laminated shales.	
4520					
4522					
4524					
4526					
4528				END OF CORE @ 14836 ft	

LITHOLOGY

siliciclastic sediments
- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates
- limestone
- dolomite
- sandy limestone

Core condition:
- Missing Core
- Rubble

others
- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS
- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN
- Aggrading/Backstepping
- Prograding

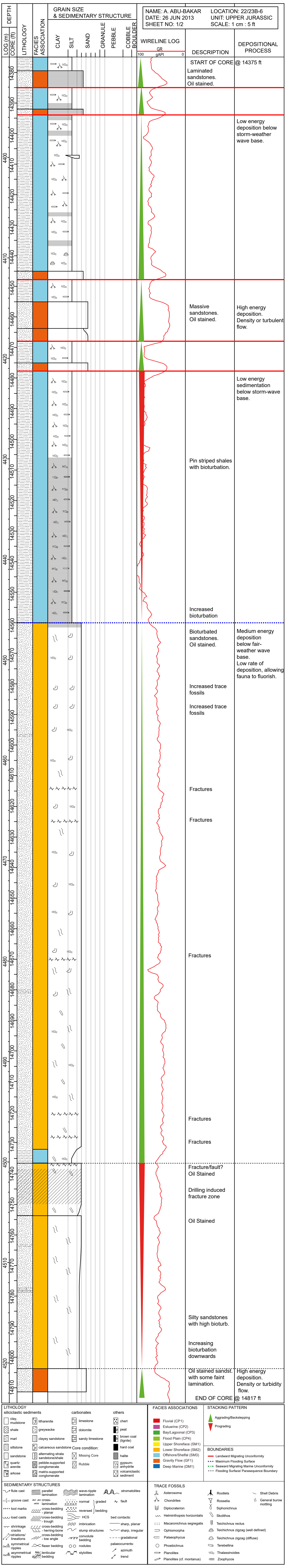
BOUNDARIES
- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES
- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal graded bedding
- reversed graded bedding
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:
- azimuth
- trend

TRACE FOSSILS
- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling


NAME: A. ABU-BAKAR
DATE: 26 JUN 2013
SHEET NO: 1/2
LOCATION: 22/23B-6
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft
GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY
SILT
SAND
GRANULE
PEBBLE
COBBLE
BOULDER
WIRELINE LOG
GR
100
gAPI
0
DEPTH
LOG (m)
CORE (ft)
LITHOLOGY
FACIES ASSOCIATION
DESCRIPTION
DEPOSITIONAL PROCESS
START OF CORE @ 14375 ft
Laminated sandstones. Oil stained.
Low energy deposition below storm-weather wave base.
Massive sandstones. Oil stained.
High energy deposition. Density or turbulent flow.
Low energy sedimentation below storm-wave base.
Pin striped shales with bioturbation.
Increased bioturbation
Bioturbated sandstones. Oil stained.
Medium energy deposition below fair-weather wave base. Low rate of deposition, allowing fauna to flourish.
Increased trace fossils
Increased trace fossils
Fractures
Fractures
Fractures
Fracture/fault? Oil Stained
Drilling induced fracture zone
Oil Stained
Silty sandstones with high bioturb.
Increasing bioturbation downwards
Oil stained sandst. with some faint lamination.
High energy deposition. Density or turbidity flow.
END OF CORE @ 14817 ft
LITHOLOGY
siliciclastic sediments
clay, mudstone
shale
marl
siltstone
sandstone
quartz arenite
arkose
litharenite
greywacke
clayey sandstone
calcareous sandstone
alternating strata sandstone/shale
pebble-supported conglomerate
matrix-supported conglomerate
carbonates
limestone
dolomite
sandy limestone
Core condition:
Missing Core
Rubble
others
chert
peat
brown coal (lignite)
hard coal
halite
gypsum-anhydrite
volcaniclastic sediment
FACIES ASSOCIATIONS
Fluvial (CP1)
Estuarine (CP2)
Bay/Lagoonal (CP3)
Flood Plain (CP4)
Upper Shoreface (SM1)
Lower Shoreface (SM2)
Offshore/Shelfal (SM3)
Gravity Flow (GF1)
Deep Marine (DM1)
STACKING PATTERN
Aggrading/Backstepping
Prograding
BOUNDARIES
Landward Migrating Unconformity
Maximum Flooding Surface
Seaward Migrating Marine Unconformity
Flooding Surface/ Parasequence Boundary
SEDIMENTARY STRUCTURES
flute cast
groove cast
tool marks
load casts
shrinkage cracks
striations/ lineations
symmetrical ripples
asymmetrical ripples
parallel lamination
cross-lamination
cross-bedding planar
cross-bedding trough
cross-bedding herring-bone
cross-bedding low angle
flaser bedding
lenticular bedding
wave-ripple lamination
normal
reversed
graded bedding
HCS
imbrication
slump structures
convolute bedding
nodules
stylolites
stromatolites
fault
bed contacts:
sharp, planar
sharp, irregular
gradational
palaeocurrents:
azimuth
trend
TRACE FOSSILS
Astersoma
Chondrites
Diplocraterion
Helminthopsis horizontalis
Macaronichnus segregatis
Ophiomorpha
Palaeophycus
Phoebichnus
Planolites
Planolites (cf. montanus)
Rodlets
Rosselia
Siphonichnus
Skolithos
Teichichnus rectus
Teichichnus zigzag (well defined)
Teichichnus zigzag (diffuse)
Terebellina
Thalassinoides
Zoophycos
Shell Debris
General burow mottling

NAME: A. ABU-BAKAR
DATE: 26 JUN 2013
SHEET NO: 1
LOCATION: 22/23B-6
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

GRAIN SIZE & SEDIMENTARY STRUCTURE: CLAY, SILT, SAND, GRANULE, PEBBLE, COBBLE, BOULDER

WIRELINE LOG: GR, 100 gAPI 0

DEPTH LOG (m) / CORE (ft)	DESCRIPTION	DEPOSITIONAL PROCESS
14820	Broken-up core.	
14830	Bioturbated siltst.	Low energy with below storm weather wave base.
14850	Oil stained sst. no apparent structures/bioturb. Generally cemented.	High energy. Deposited by density or turbulent flow.
14870	Highly bioturbated silty shales.	Low energy with below storm weather wave base.
14890	Oil stained sst. with bioturbation seen in cemented parts.	Medium energy, low rate of deposition below fair weather wave base.
14910	Bioturbated sandstones.	
14930	Drilling induced fracture zone	
14950		
14970		Low energy with low rate of deposition below storm weather wave base.
14990	Drilling induced fracture zone	
15010		Medium energy, low rate of deposition below fair weather wave base.
15030		
15050	Drilling induced fracture zone	
15070		
15090	Bioturbated sandstones.	Medium energy, low rate of deposition below fair-weather wave base.
15110	Intensely bioturbated silty sandstones.	Low energy with low rate of deposition below storm-weather wave base.
15130		
15150	Broken-up cores	

END OF CORE @ 15150 ft

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:
- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:
- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU-BAKAR
DATE: 28 MAY 2014
SHEET NO: 1/1
LOCATION: 22/27A-1
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

DEPTH (ft) | LITHOLOGY | FACIES ASSOCIATION | GRAIN SIZE & SEDIMENTARY STRUCTURE (CLAY, SILT, SAND, GRANULE, PEBBLE, COBBLE, BOULDER) | WIRELINE LOG (GR, 100 gAPI 0; Depth (m MD)) | DESCRIPTION | DEPOSITIONAL PROCESSES

TOP OF CORE @ 14752 ft

DEPTH (ft)	Depth (m MD)	DESCRIPTION	DEPOSITIONAL PROCESSES
14750	4505	Chaotic bedding fabric (slumping?)	Turbulent or density flow.
14760			
14770	4510	Massive sandstones.	Turbulent or density flow.
14780			
14790	4515	Fissile silty mudst. bioturbated.	
14800		Massive sandstones.	Turbulent or density flow.
14810	4520		
14820			
14830	4525		
14840		Wavy laminated, occ. mottled, bioturbated.	Turbulent or density flow.
14850	4530	Massive sandstones. Oil-stained	
14860	4535		

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault
- shale clast

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

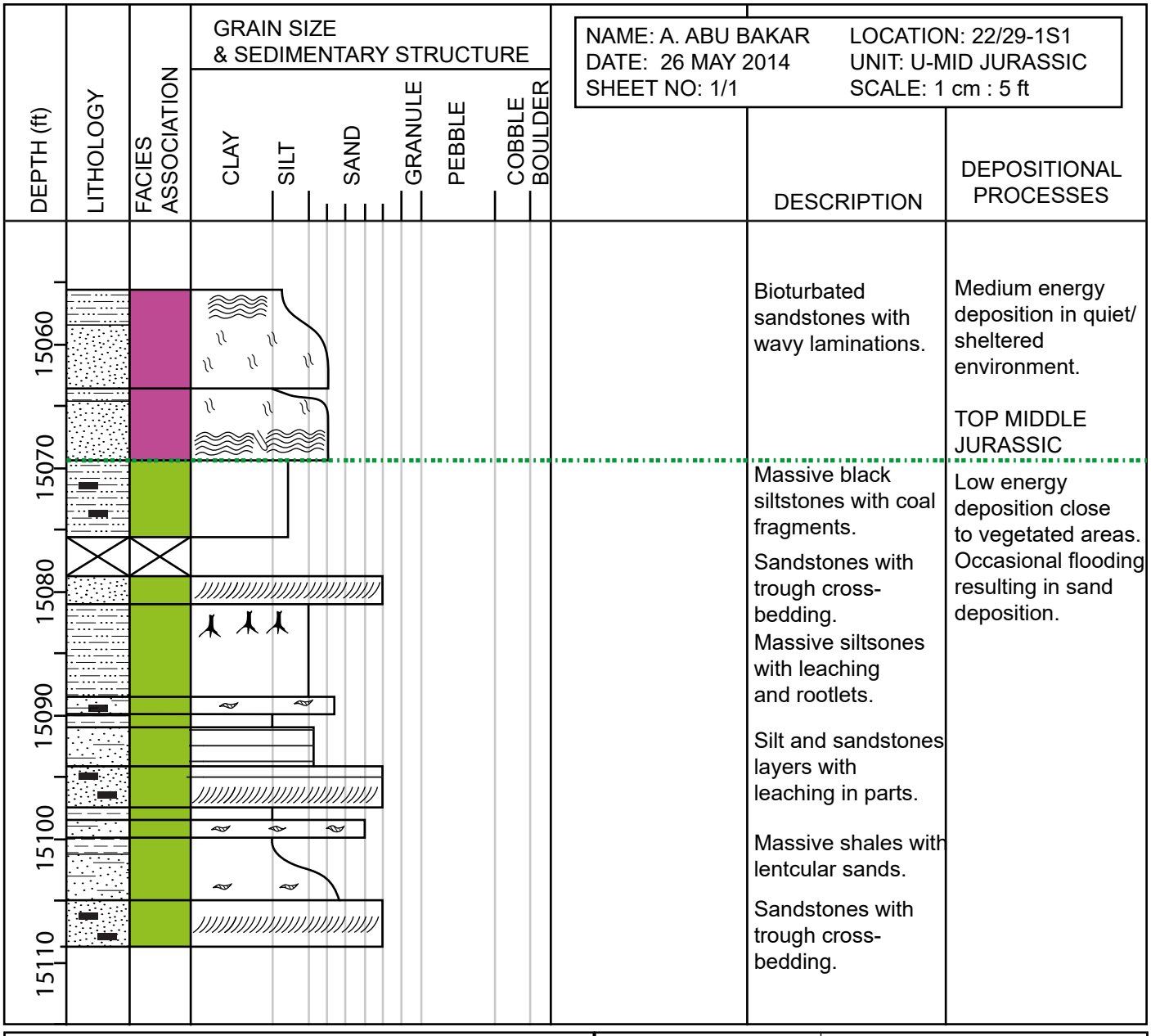
palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU BAKAR
DATE: 26 MAY 2014
SHEET NO: 1/1
LOCATION: 22/29-1S1
UNIT: U-MID JURASSIC
SCALE: 1 cm : 5 ft



DESCRIPTION	DEPOSITIONAL PROCESSES
Bioturbated sandstones with wavy laminations.	Medium energy deposition in quiet/ sheltered environment.
	TOP MIDDLE JURASSIC
Massive black siltstones with coal fragments.	Low energy deposition close to vegetated areas. Occasional flooding resulting in sand deposition.
Sandstones with trough cross-bedding.	
Massive siltsones with leaching and rootlets.	
Silt and sandstones layers with leaching in parts.	
Massive shales with lentcular sands.	
Sandstones with trough cross-bedding.	

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
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- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

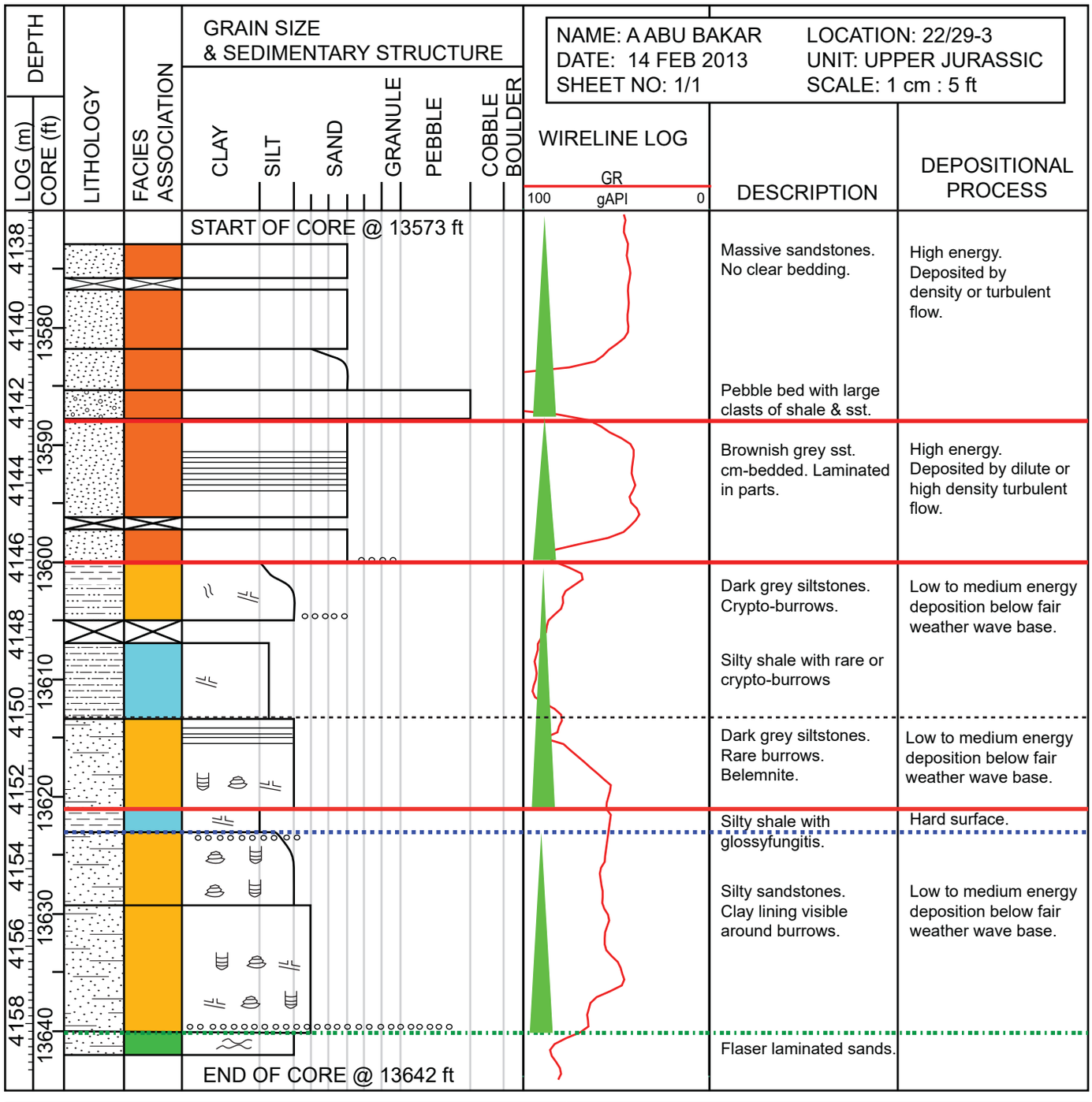
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
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- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
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- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
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- Planolites
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- Skolithos
- Teichichnus rectus
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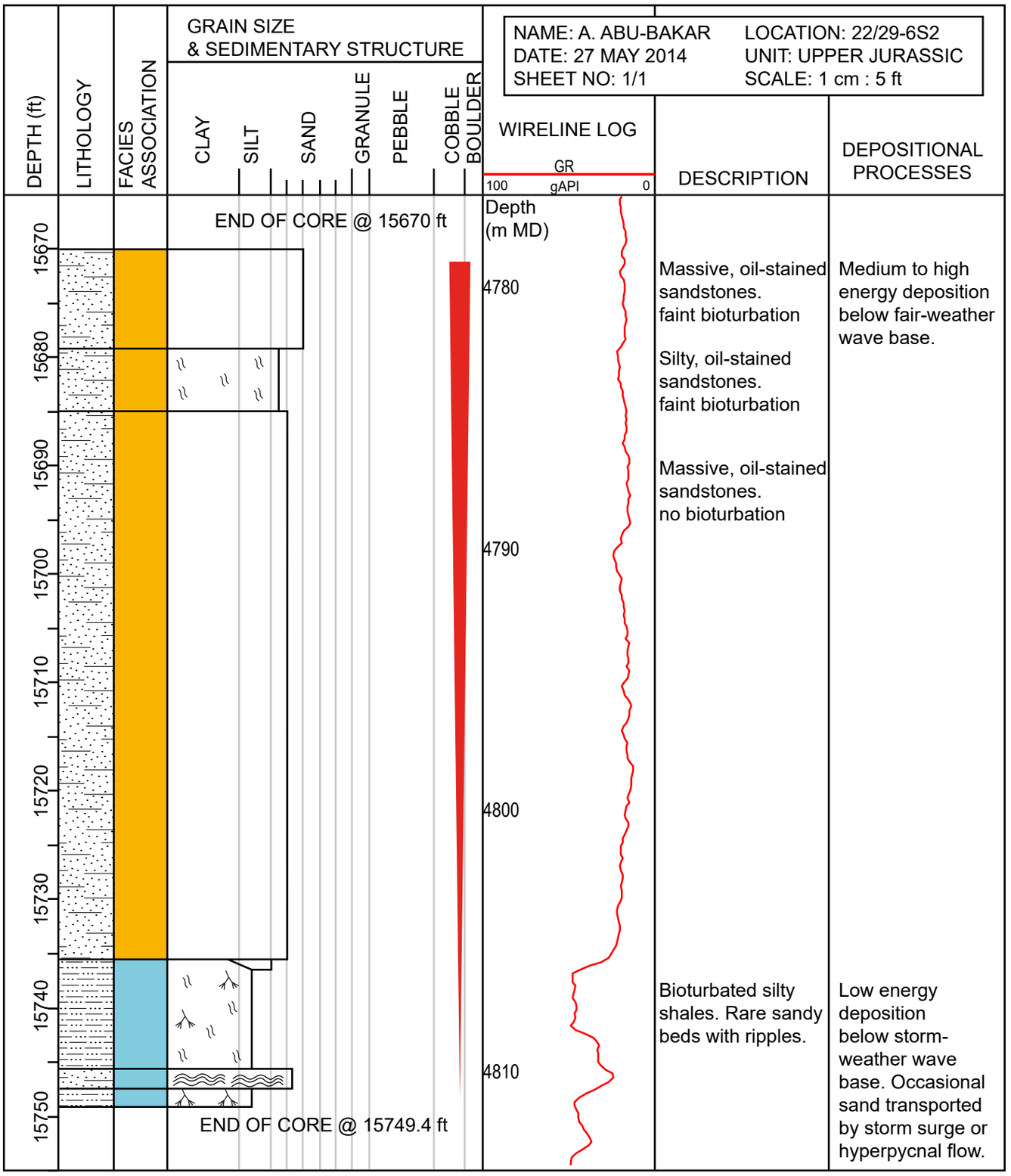
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling



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- litharenite
- greywacke
- clayey sandstone
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- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
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- Upper Shoreface (SM1)
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- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

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- normal (graded bedding)
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- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

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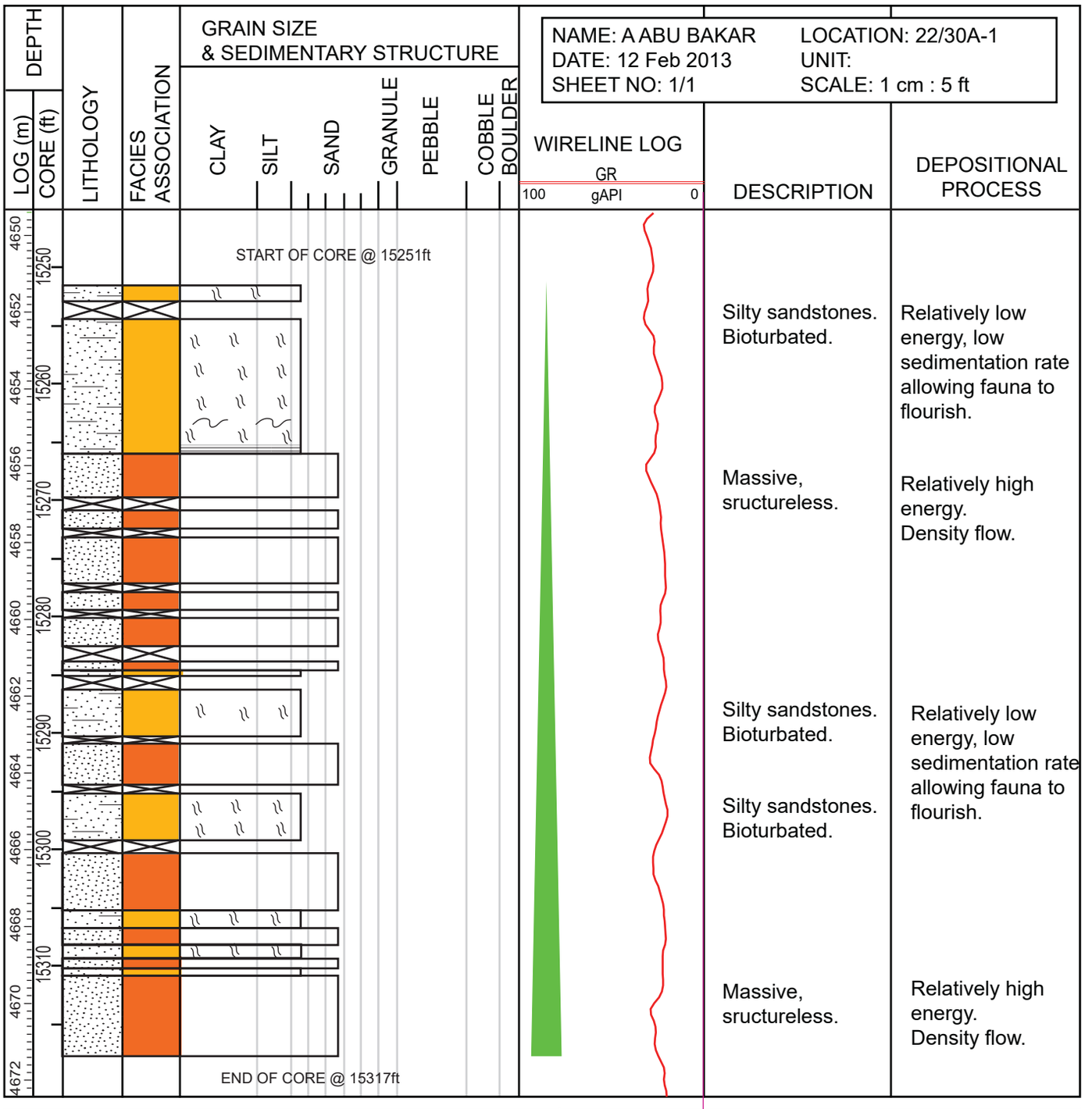
- Zoophycos
- Shell Debris
- General burow mottling



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- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
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STACKING PATTERN

- Aggrading/Backstepping
- Prograding

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- HCS
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- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

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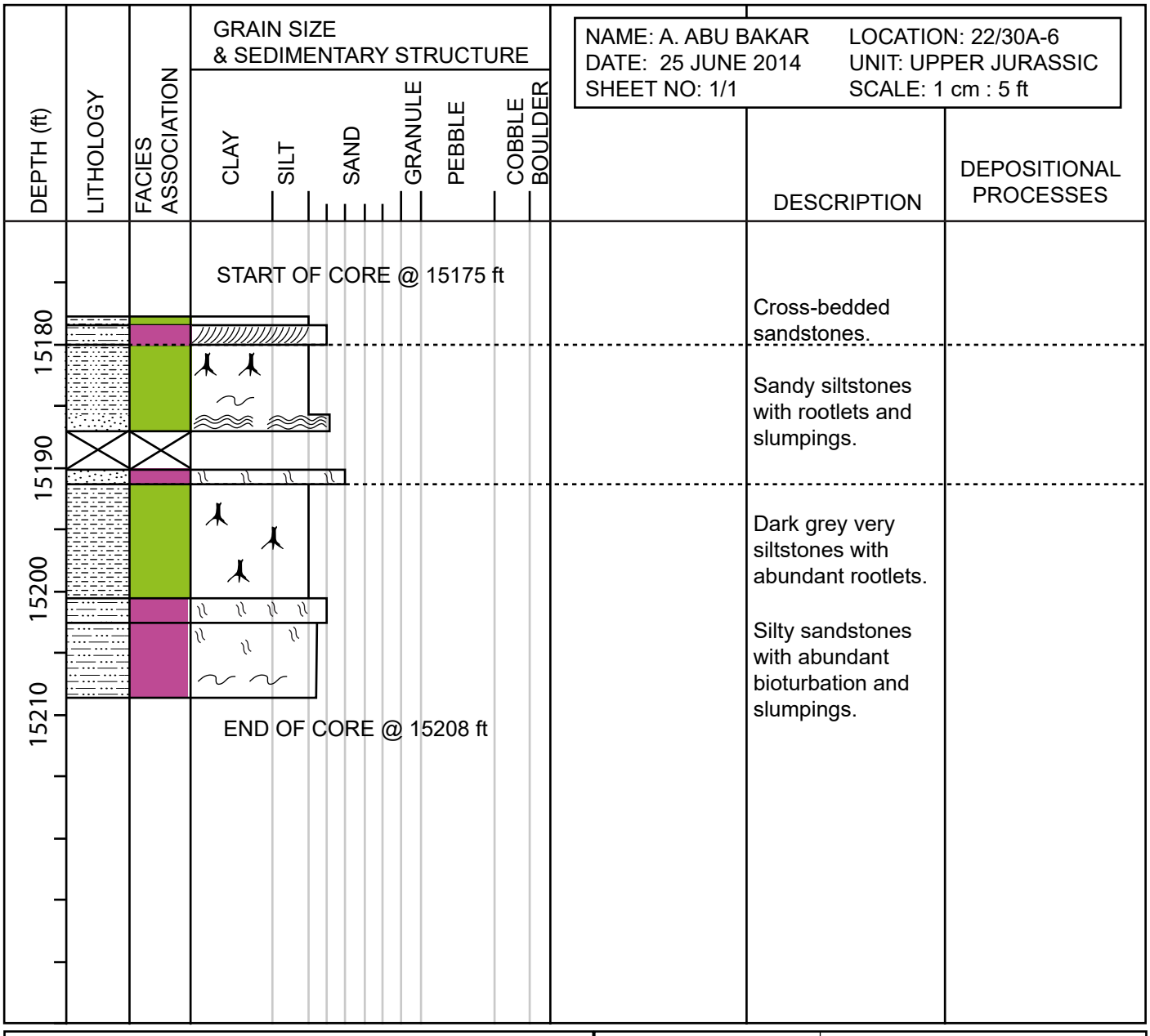

LITHOLOGY

siliciclastic sediments

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- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
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FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
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STACKING PATTERN

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- Prograding

BOUNDARIES

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- lenticular bedding
- wave-ripple lamination
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- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

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- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU-BAKAR
DATE: 25 JUN 2013
SHEET NO: 1/1
LOCATION: 22/30B-11
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

DEPTH
LOG (m) / CORE (ft)
LITHOLOGY
FACIES ASSOCIATION
GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY | SILT | SAND | GRANULE | PEBBLE | COBBLE | BOULDER
WIRELINE LOG
GR
100 gAPI 0

START OF CORE @ 16456 ft

DESCRIPTION	DEPOSITIONAL PROCESS
Generally massive sandstones with occasional laminations. Oil stained.	High energy deposition in density or turbulent flow.
Broken-up core	
Intensely bioturb. sandstones.	Medium energy deposition below fair-weather wave base. Slow rate of sedimentation allowing fauna to flourish.
Generally mottled sandstones with occational burows.	
Faint cross beds coaly materials.	
Generally mottled sandstones with occational burows.	

END OF CORE @ 16640 ft

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:
- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

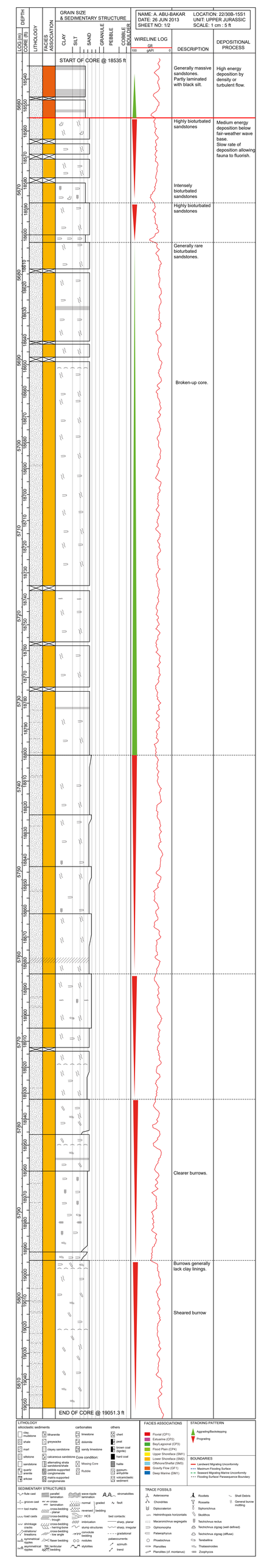
- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

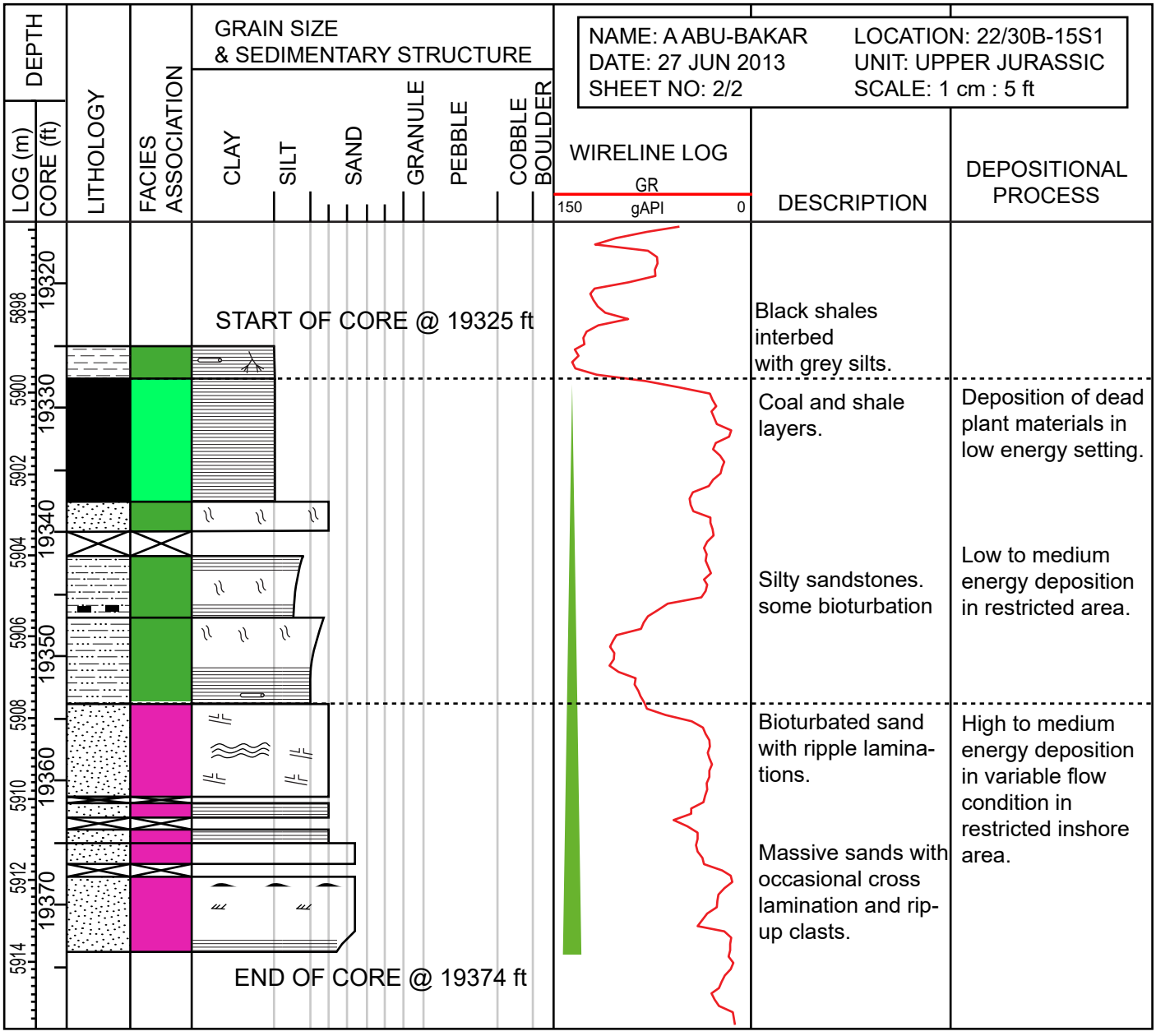
bed contacts:
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:
- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling


NAME: A. ABU-BAKAR
DATE: 26 JUN 2013
SHEET NO: 1/2
LOCATION: 22/30B-15S1
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft
GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY
SILT
SAND
GRANULE
PEBBLE
COBBLE
BOULDER
WIRELINE LOG
GR
100
gAPI
0
DEPTH
CORE (ft)
LOG (m)
LITHOLOGY
FACIES ASSOCIATION
DESCRIPTION
DEPOSITIONAL PROCESS
START OF CORE @ 18535 ft
Generally massive sandstones. Partly laminated with black silt.
High energy deposition by density or turbulent flow.
Highly bioturbated sandstones
Medium energy deposition below fair-weather wave base.
Slow rate of deposition allowing fauna to fluorish.
Intensely bioturbated sandstones
Highly bioturbated sandstones
Generally rare bioturbated sandstones.
Broken-up core.
Clearer burrows.
Burrows generally lack clay linings.
Sheared burrow
END OF CORE @ 19051.3 ft
LITHOLOGY
siliciclastic sediments
clay mudstone
shale
marl
siltstone
sandstone
quartz arenite
arkose
bituminous shale
greywacke
clayey sandstone
calcareous sandstone
alternating shale sandstone/shale
pebble-supported conglomerate
matrix-supported conglomerate
carbonates
limestone
dolomite
sandy limestone
Core condition:
Missing Core
Rubble
others
chert
coal
brown coal (lignite)
hard coal
halite
gypsum-anhydrite
volcaniclastic sediment
FACIES ASSOCIATIONS
Fluvial (CP1)
Estuarine (CP2)
Bay/Lagoonal (CP3)
Flood Plain (CP4)
Upper Shoreface (SM1)
Lower Shoreface (SM2)
Offshore/Shelfal (SM3)
Gravity Flow (GF1)
Deep Marine (SM1)
STACKING PATTERN
Aggrading/Backstepping
Prograding
BOUNDARIES
Landward Migrating Unconformity
Maximum Flooding Surface
Seaward Migrating Marine Unconformity
Flooding Surface/ Parasequence Boundary
SEDIMENTARY STRUCTURES
flute cast
groove cast
tool marks
load casts
shrinkage cracks / crazing / fractures
symmetrical ripples
asymmetrical ripples
parallel lamination
wavy lamination
cross-bedding - planar
cross-bedding - trough
cross-bedding - herring-bone
cross-bedding - low angle
flaser bedding
wave-ripple lamination
normal
reversed
graded bedding
HCS
imbrication
slump structures
stromatolite bedding
nodules
stylolites
stromatolites
fault
bed contacts:
sharp, planar
sharp, irregular
gradational
palaeocurrents:
azimuth
trend
TRACE FOSSILS
Asterosoma
Chondrites
Diplocraterion
Helminthopsis horizontalis
Macaronichnus segregatis
Ophiomorpha
Palaeophycus
Phycteschnus
Planolites
Planolites (cf. montanus)
Rhodelis
Rosselia
Siphonichnus
Skolithos
Teichichnus rectus
Teichichnus zigzag (well defined)
Teichichnus zigzag (diffuse)
Terebellina
Thalassinoides
Zoophycos
Shell Debris
General burrow mottling



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault
- shale clast

bed contacts:

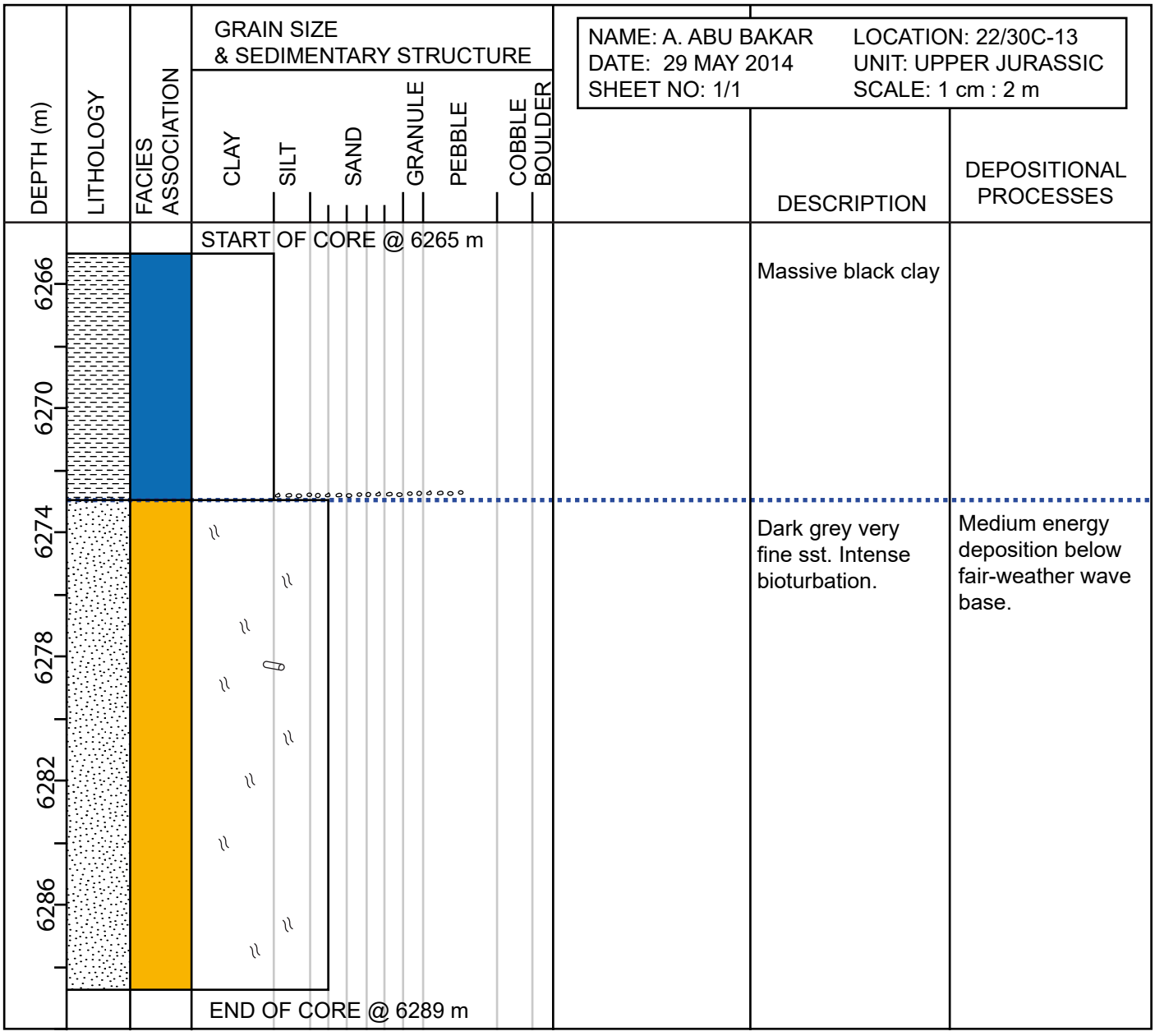
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
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- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
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- Planolites (cf. montanus)
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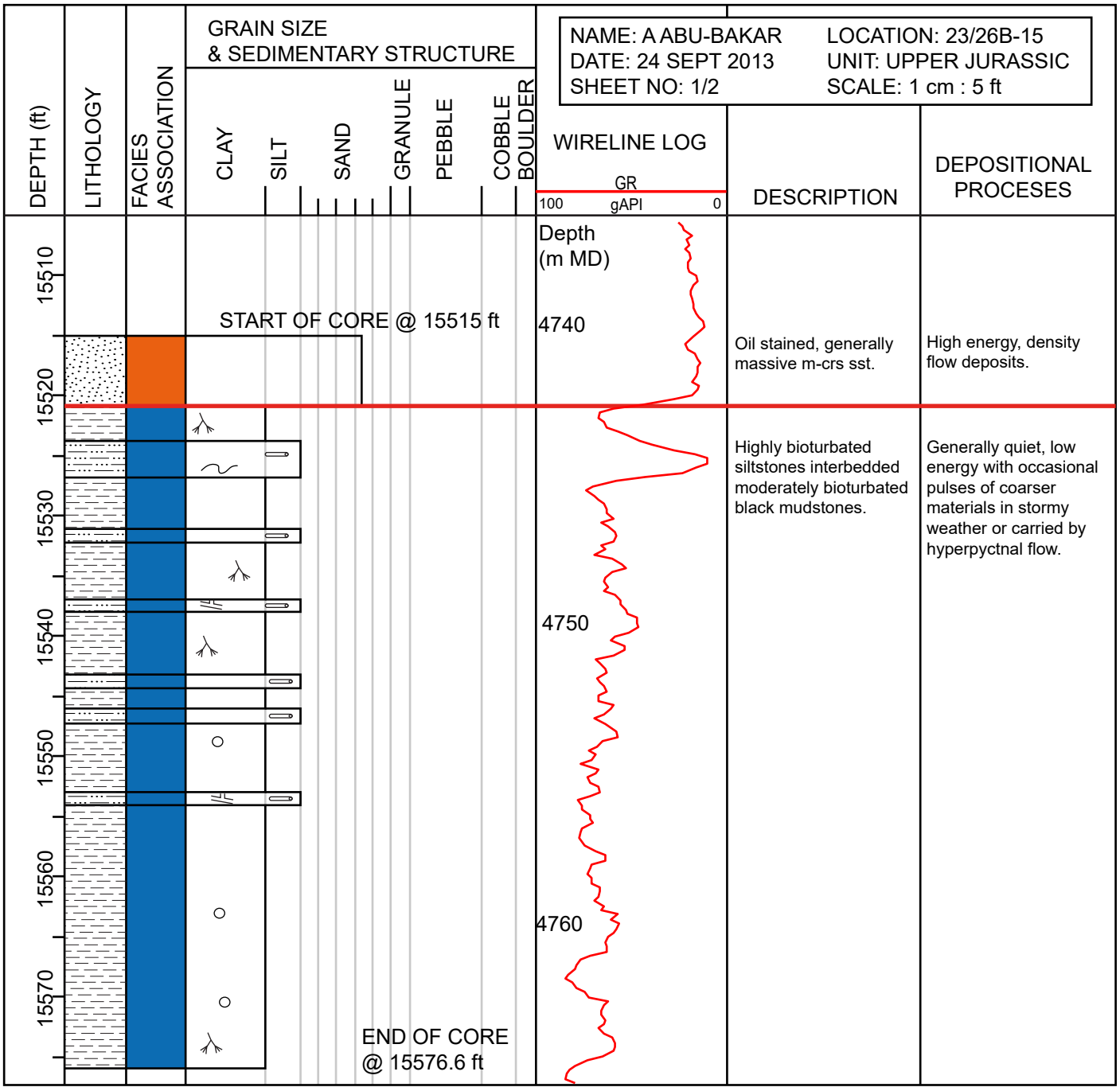
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling



LITHOLOGY

siliciclastic sediments

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- marl
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- greywacke
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- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
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- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

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- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A ABU-BAKAR
DATE: 24 SEP 2013
SHEET NO: 2/2
LOCATION: 23/26B-15
UNIT: FULMAR
SCALE: 1 cm : 5 ft

DEPTH (ft) | LITHOLOGY | FACIES ASSOCIATION | GRAIN SIZE & SEDIMENTARY STRUCTURE (CLAY, SILT, SAND, GRANULE, PEBBLE, COBBLE, BOULDER)

START OF CORE @ 16042 ft

DESCRIPTION	DEPOSITIONAL PROCESSES
Intensely bioturbated sandstones with occasional fractures.	Low sedimentation rate where organisms are able to flourish. Shallow water below the fair weather wave base.
Generally massive sandstones with occasional fractures and low bioturbation. Occasional ripple laminations.	High energy deposition perhaps caused by storm.
High to intensely bioturbated sandstones	Low sedimentation rate where organisms are able to flourish. Shallow water below the fair weather wave base.
Glossifungitis layer	Hard surface representing break in sedimentation.

END OF CORE @ 16254 ft

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU-BAKAR
DATE: 23 SEPT 2013
SHEET NO: 1/1
LOCATION: 29/02A-2
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

GRAIN SIZE & SEDIMENTARY STRUCTURE: CLAY, SILT, SAND, GRANULE, PEBBLE, COBBLE, BOULDER

WIRELINE LOG: GR, 100 gAPI 0

START OF CORE @ 12717 ft

DEPTH (m MD)

3880

3890

3900

3910

3920

3930

3940

END OF CORE @ 12894 ft

DEPTH (ft)	DESCRIPTION	DEPOSITIONAL PROCESSES
12720–12730	Highly bioturbated sandstones. Abundant ripple laminations. Occasional shell fragments.	Medium to high energy deposition but slow enough rate allowing for fauna to fluorished. Sheltered from wave action.
12740	Glossifungitis. Bioturbated sand-stone.	High to medium energy deposition in restricted area.
12750–12760	Massive, oil-stained sandstones.	
12770–12810	Massive sst. Abundant coaly materials. Occasionally laminated or cross-bedded. Lack of bioturbation.	High energy deposition. Unidirectional flow. Close to vegetated area.
12820–12850	Generally massive or mottled. Abundant bio-turbation.	Medium to high energy deposition but slow enough rate allowing for fauna to fluorished.
12860–12890	Ripple lamination. Less bioturbation.	

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
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- parallel lamination
- cross-lamination
- cross-bedding - planar
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- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal graded bedding
- reversed graded bedding
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
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- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A ABU BAKAR
DATE: 14 FEB 2013
SHEET NO: 1

LOCATION: 29/4A-1A
UNIT:
SCALE: 1 cm : 5 ft

GRAIN SIZE & SEDIMENTARY STRUCTURE: CLAY | SILT | SAND | GRANULE | PEBBLE | COBBLE | BOULDER

WIRELINE LOG: GR, 100 gAPI 0

DEPTH LOG (m)	DEPTH CORE (ft)	DESCRIPTION	DEPOSITIONAL PROCESS
		START OF CORE @ 14929 ft	
4550	14930	Intense bioturbation. Abundant water escape feartures.	Medium energy deposition below fair-weather wave base.
	14940		
	14950	Intense bioturbation. Abundant water escape feartures.	
4560	14960		
	14970	Burrows generally lack clay linings. Becoming more intense towards the bottom of the bed.	
	14980		
4570	14990		
	15000		
	15010	The top of the bed is fractured. Cross bedding consists of sand and clay couplets.	Medium energy deposition above fair-weather wave base. influenced by tidal currents.
	15020		
4580	15030		
	15040	Cross bedding consists of coarse and fine sand couplets.	
	15050		
4590	15060	Burrows generally rare towards the top. Becoming more intense towards the bottom of the bed.	Medium energy deposition below fair-weather wave base.
	15070	No visible burrows.	
	15080		
4600	15090	Less bioturbation upwards	
	15100	Less bioturbation upwards	
	15110	Core is broken up	
	15120		
4610	15130	Less bioturbation upwards	
	15140		
	15150	Clay pebbles	
4620	15160	Bigger burrow size	
	15170	Clay lining in burrows reduce upwards	
	15180		
4630	15190	Cross-bedded with coarse-fine couplets. Deformed on top of each package.	
	15200	Cemented sandstones. Sharp, irregular top. SIlty sst, crypto-burrows	
		END OF CORE @ 15204 ft	

LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
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- wave-ripple lamination
- normal graded bedding
- reversed graded bedding
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU BAKAR
DATE: 25 JUNE 2013
SHEET NO: 1/1
LOCATION: 29/7-3
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft

DEPTH LOG (m) / CORE (ft) | LITHOLOGY | ENVIRONMENT OF DEPOSITION | GRAIN SIZE & SEDIMENTARY STRUCTURE (CLAY, SILT, SAND, GRANULE, PEBBLE, COBBLE, BOULDER) | WIRELINE LOG (GR, 100 gAPI 0) | DESCRIPTION | DEPOSITIONAL PROCESS

START OF CORE @ 12379 ft

LOG (m)	CORE (ft)	DESCRIPTION	DEPOSITIONAL PROCESS
3775	12380	Bioturbated sandstones. Occasionally cross bedded and laminated.	Medium energy deposition below fair-weather wave base.
3780	12400		
3785	12410	Bioturbated sandstones	
	12420		
3790	12430	Coal, coaly shales interbedded with brown bioturbated siltstones.	Low energy deposition. Close to vegetated areas. Sands delivered by occasional flooding.
	12440		
3795	12450		
	12460	Dark grey bioturbated siltstones.	Low to medium energy deposition. Low sedimentation rate allowing fauna to fluorished.
3800	12470	Bioturbated sands with occasional lenticular laminations.	
3805	12480		
	12490	Dark grey bioturbated siltstones.	Low energy deposition. Low sedimentation rate allowing fauna to fluorished.
3810	12500	Fracture Dark brown bioturb. siltstone.	
	12510	Bioturbated sands with occasional lenticular laminations.	
3815	12520		
3820	12530	Sandy bioturbated siltstones with lenticular lamination.	
	12540		
3825	12550	Grey bioturbated siltstones with rootlets.	Low energy deposition close to land. Low sedimentation rate.

END OF CORE @ 12550 ft

LITHOLOGY

siliciclastic sediments
- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates
- limestone
- dolomite
- sandy limestone

Core condition:
- Missing Core
- Rubble

others
- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS
- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN
- Aggrading/Backstepping
- Prograding

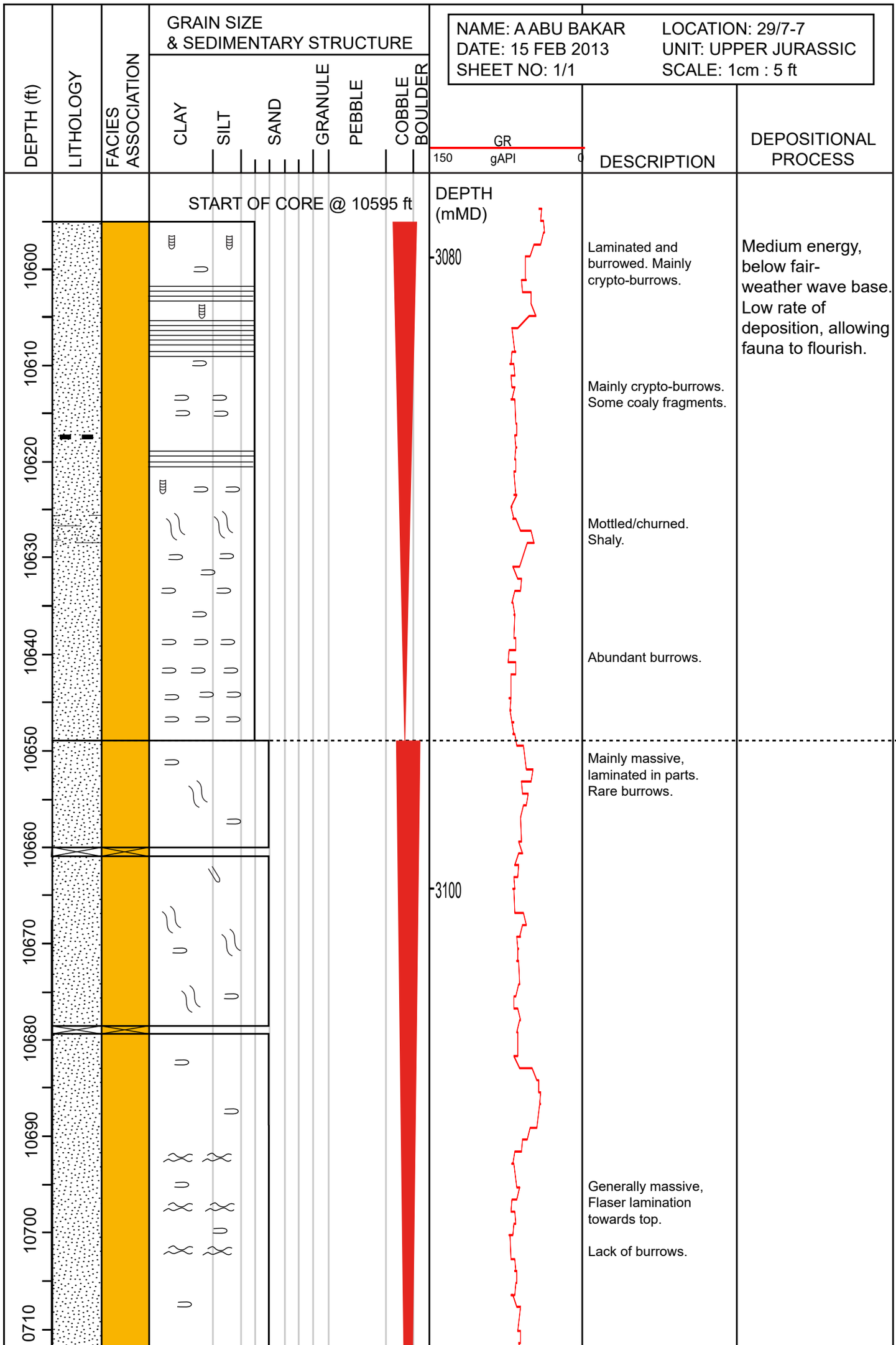
BOUNDARIES
- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

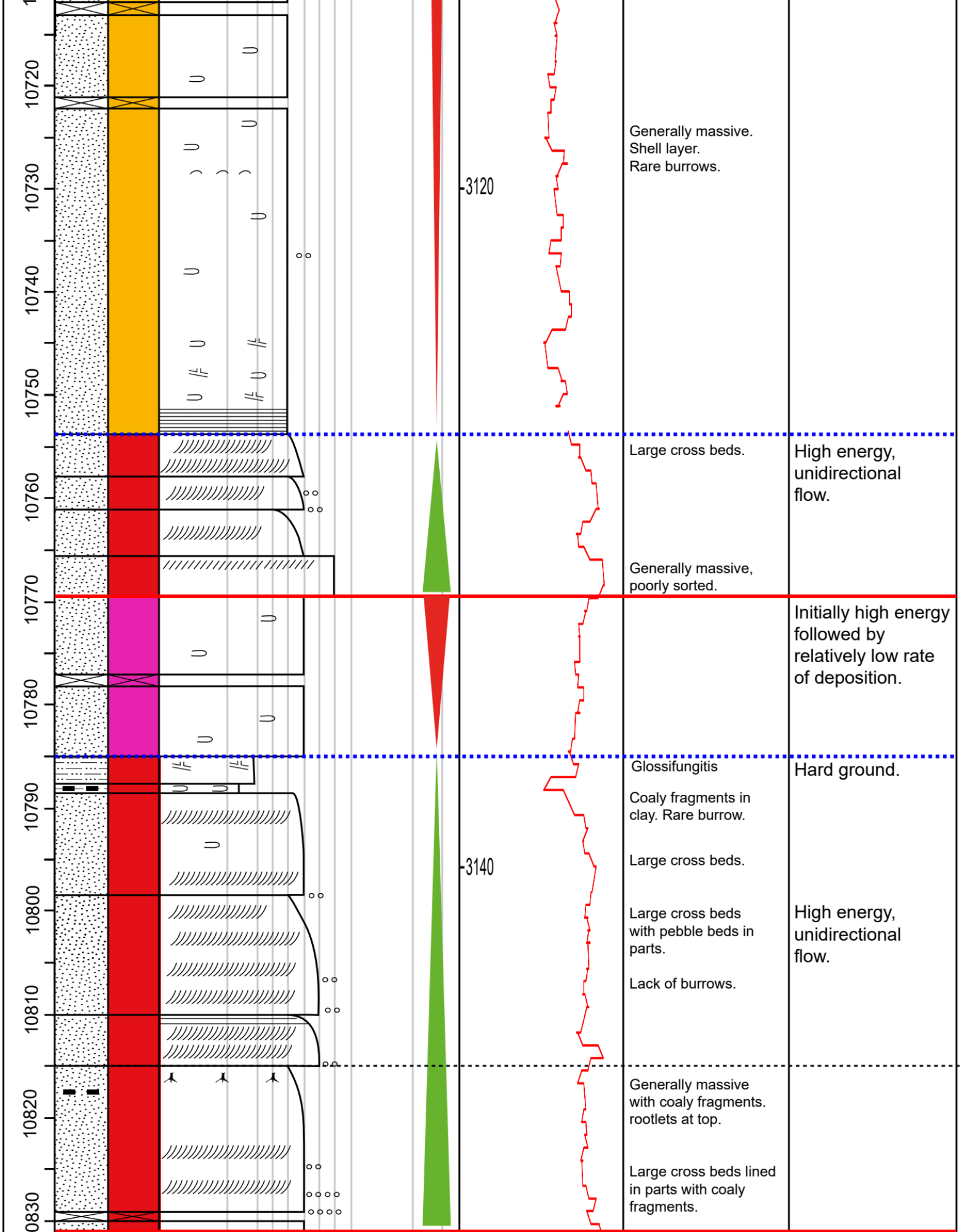
SEDIMENTARY STRUCTURES
- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

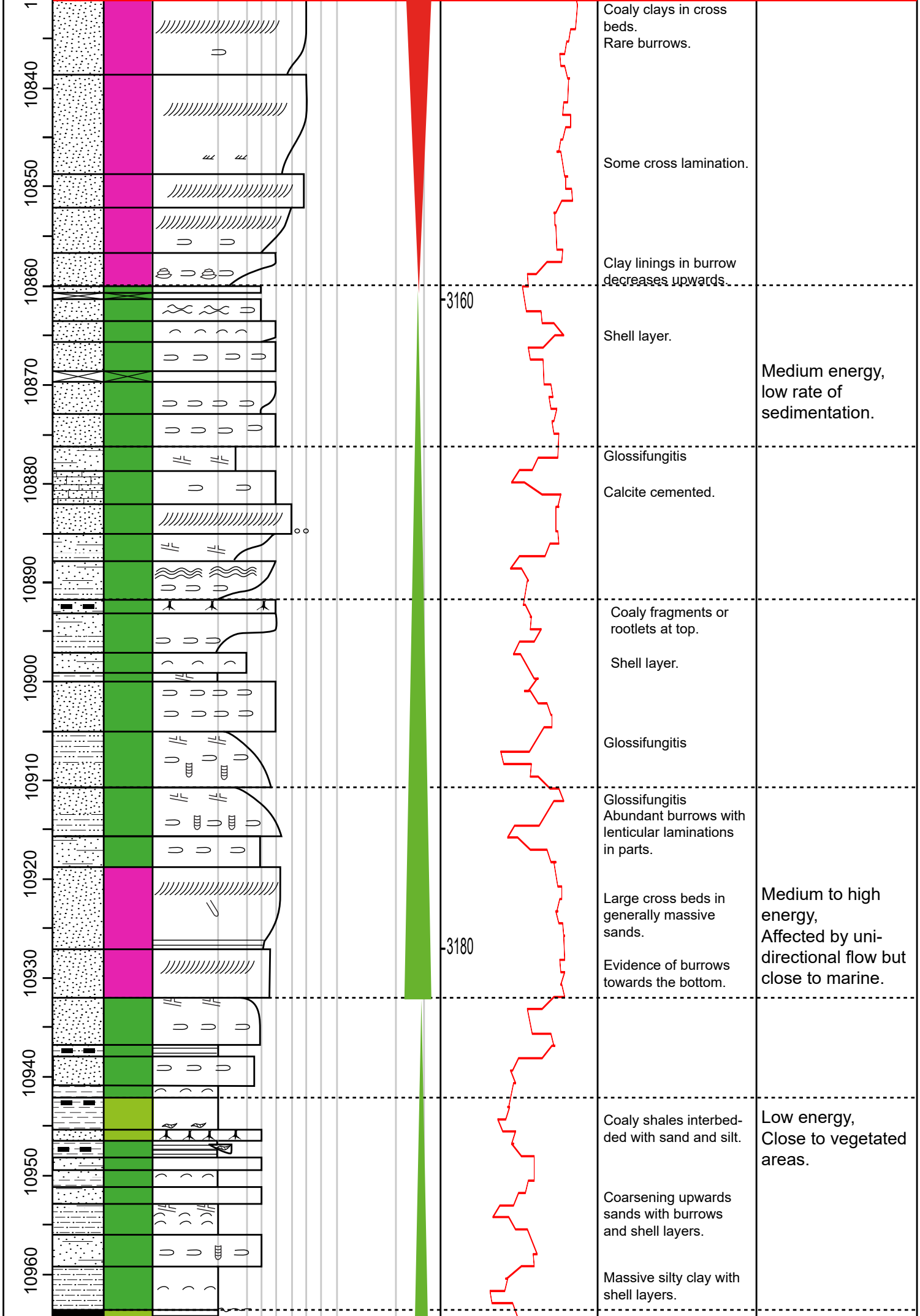
bed contacts:
- sharp, planar
- sharp, irregular
- gradational

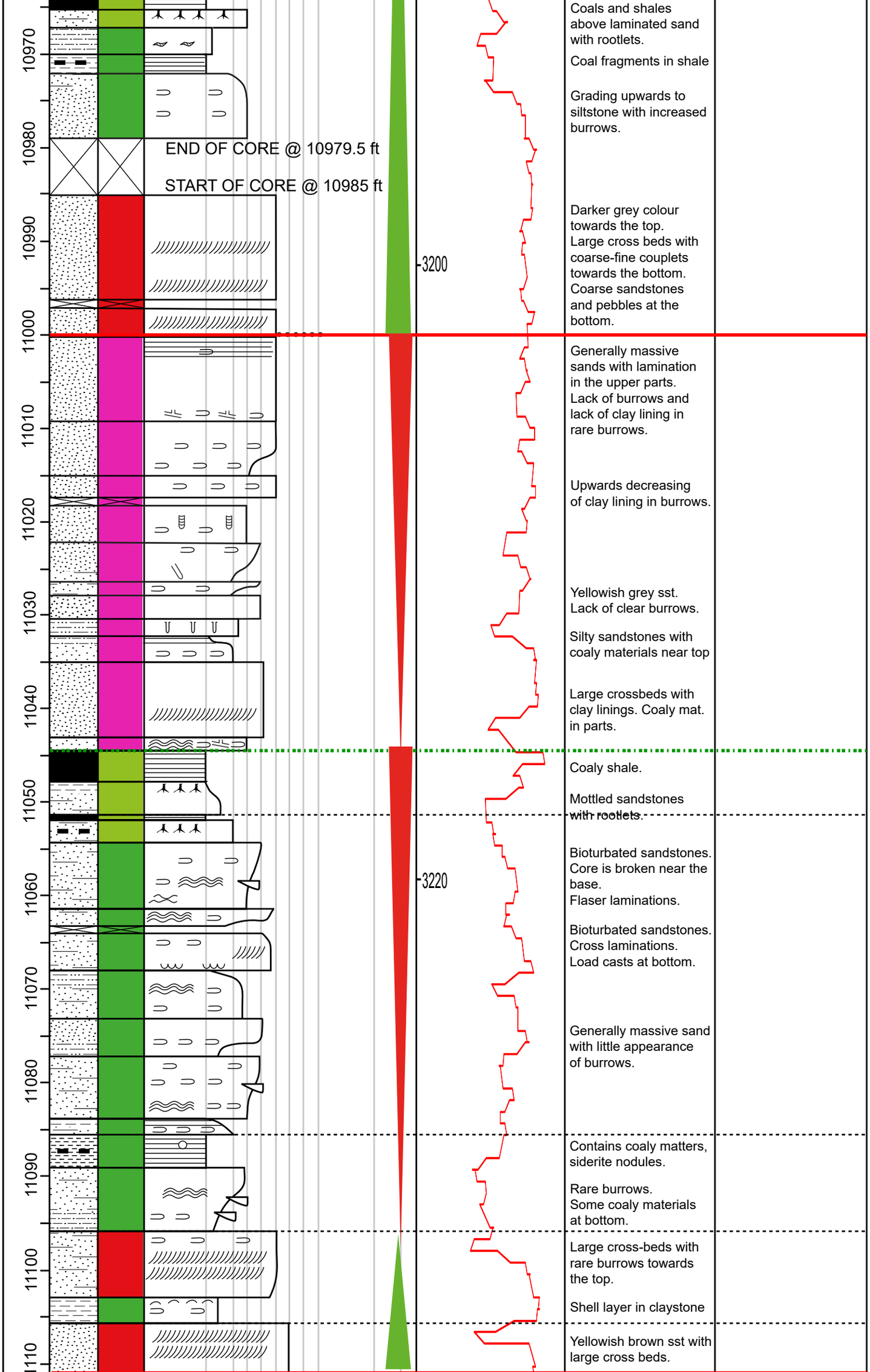
palaeocurrents:
- azimuth
- trend

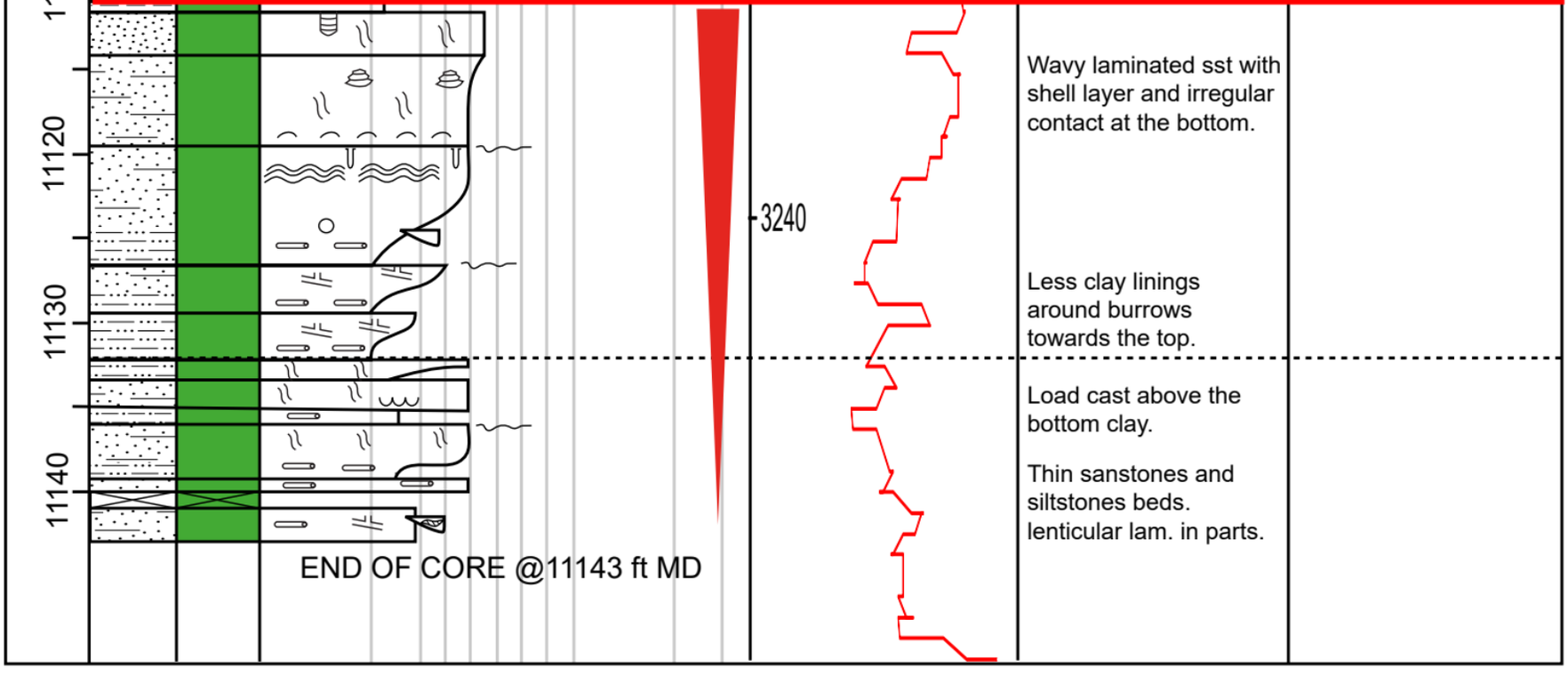
TRACE FOSSILS
- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling


NAME: A ABU BAKAR
DATE: 15 FEB 2013
SHEET NO: 1/1
LOCATION: 29/7-7
UNIT: UPPER JURASSIC
SCALE: 1cm : 5 ft
DEPTH (ft)
LITHOLOGY
FACIES ASSOCIATION
GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY
SILT
SAND
GRANULE
PEBBLE
COBBLE
BOULDER
START OF CORE @ 10595 ft
GR
150
gAPI
0
DEPTH (mMD)
3080
3100
10600
10610
10620
10630
10640
10650
10660
10670
10680
10690
10700
0710
DESCRIPTION
Laminated and burrowed. Mainly crypto-burrows.
Mainly crypto-burrows. Some coaly fragments.
Mottled/churned. Shaly.
Abundant burrows.
Mainly massive, laminated in parts. Rare burrows.
Generally massive, Flaser lamination towards top.
Lack of burrows.
DEPOSITIONAL PROCESS
Medium energy, below fair-weather wave base. Low rate of deposition, allowing fauna to flourish.


10720
10730
10740
10750
10760
10770
10780
10790
10800
10810
10820
0830
3120
3140
Generally massive.
Shell layer.
Rare burrows.
Large cross beds.
High energy, unidirectional flow.
Generally massive, poorly sorted.
Initially high energy followed by relatively low rate of deposition.
Glossifungitis
Hard ground.
Coaly fragments in clay. Rare burrow.
Large cross beds.
Large cross beds with pebble beds in parts.
High energy, unidirectional flow.
Lack of burrows.
Generally massive with coaly fragments. rootlets at top.
Large cross beds lined in parts with coaly fragments.


10840
10850
10860
10870
10880
10890
10900
10910
10920
10930
10940
10950
10960
3160
3180
Coaly clays in cross beds.
Rare burrows.
Some cross lamination.
Clay linings in burrow decreases upwards.
Shell layer.
Medium energy, low rate of sedimentation.
Glossifungitis
Calcite cemented.
Coaly fragments or rootlets at top.
Shell layer.
Glossifungitis
Glossifungitis
Abundant burrows with lenticular laminations in parts.
Large cross beds in generally massive sands.
Evidence of burrows towards the bottom.
Medium to high energy,
Affected by uni-directional flow but close to marine.
Coaly shales interbed-ded with sand and silt.
Coarsening upwards sands with burrows and shell layers.
Massive silty clay with shell layers.
Low energy,
Close to vegetated areas.


10970
10980
10990
11000
11010
11020
11030
11040
11050
11060
11070
11080
11090
11100
1110
END OF CORE @ 10979.5 ft
START OF CORE @ 10985 ft
3200
3220
Coals and shales above laminated sand with rootlets.
Coal fragments in shale
Grading upwards to siltstone with increased burrows.
Darker grey colour towards the top.
Large cross beds with coarse-fine couplets towards the bottom.
Coarse sandstones and pebbles at the bottom.
Generally massive sands with lamination in the upper parts.
Lack of burrows and lack of clay lining in rare burrows.
Upwards decreasing of clay lining in burrows.
Yellowish grey sst.
Lack of clear burrows.
Silty sandstones with coaly materials near top
Large crossbeds with clay linings. Coaly mat. in parts.
Coaly shale.
Mottled sandstones with rootlets.
Bioturbated sandstones.
Core is broken near the base.
Flaser laminations.
Bioturbated sandstones.
Cross laminations.
Load casts at bottom.
Generally massive sand with little appearance of burrows.
Contains coaly matters, siderite nodules.
Rare burrows.
Some coaly materials at bottom.
Large cross-beds with rare burrows towards the top.
Shell layer in claystone
Yellowish brown sst with large cross beds.



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

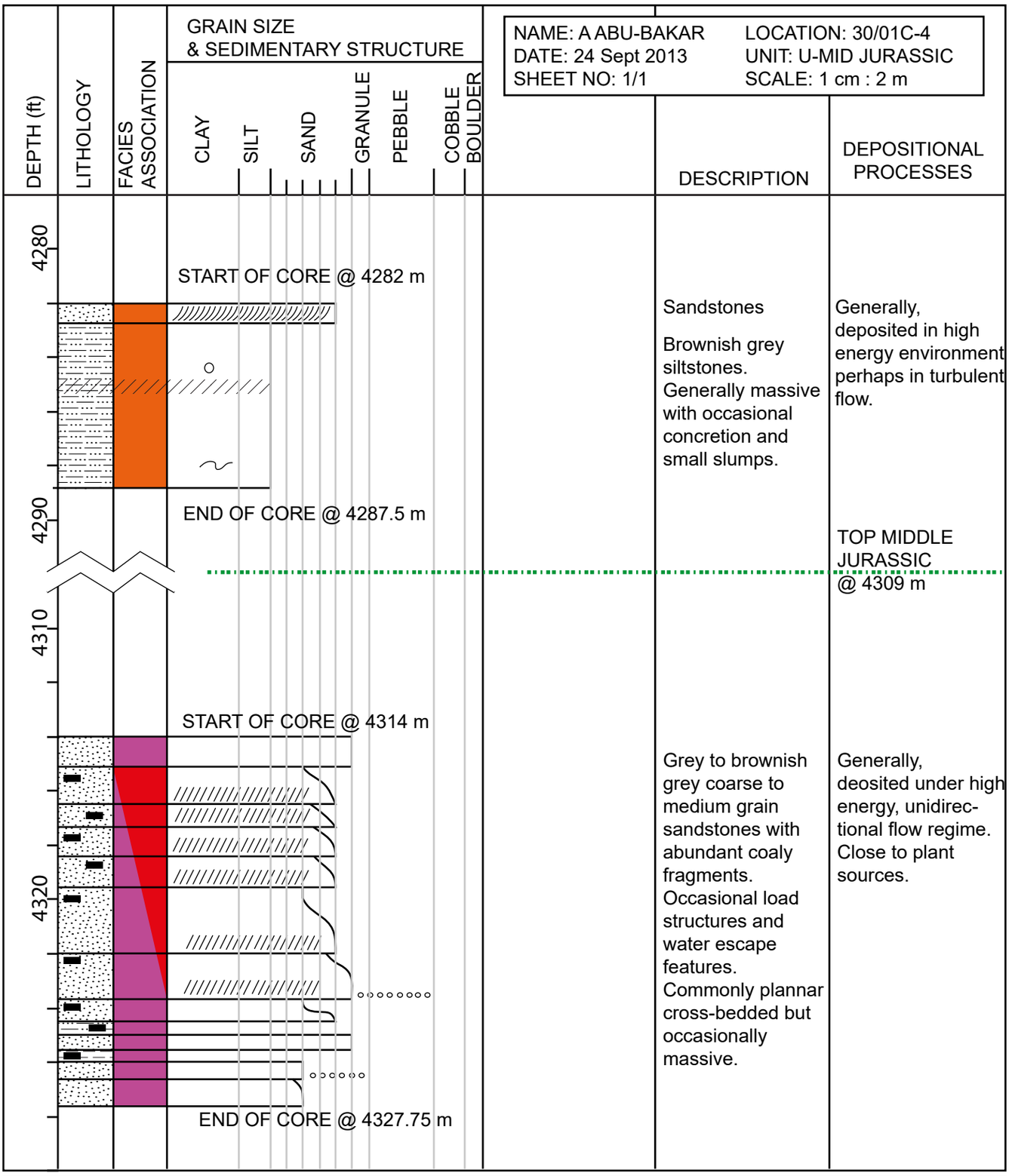
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
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- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
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- Deep Marine (DM1)

STACKING PATTERN

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- Prograding

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- fault

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- sharp, planar
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- gradational

palaeocurrents:

- azimuth
- trend

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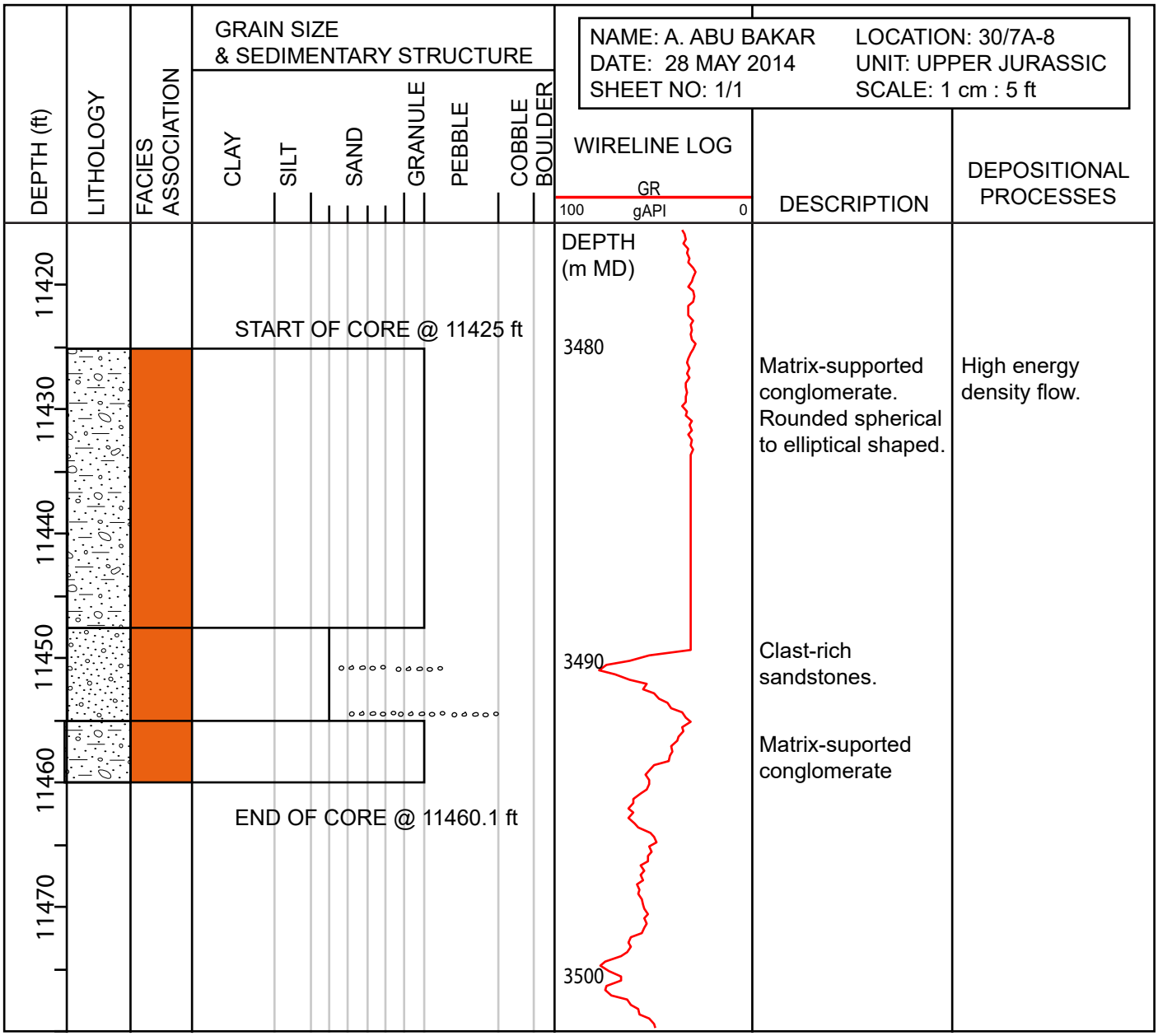
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling

NAME: A. ABU BAKAR
DATE: 28 MAY 2014
SHEET NO: 1/1
LOCATION: 30/7A-8
UNIT: UPPER JURASSIC
SCALE: 1 cm : 5 ft



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
- tool marks
- load casts
- shrinkage cracks
- striations/ lineations
- symmetrical ripples
- asymmetrical ripples
- parallel lamination
- cross-lamination
- cross-bedding - planar
- cross-bedding - trough
- cross-bedding - herring-bone
- cross-bedding - low angle
- flaser bedding
- lenticular bedding
- wave-ripple lamination
- normal (graded bedding)
- reversed (graded bedding)
- HCS
- imbrication
- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault

bed contacts:

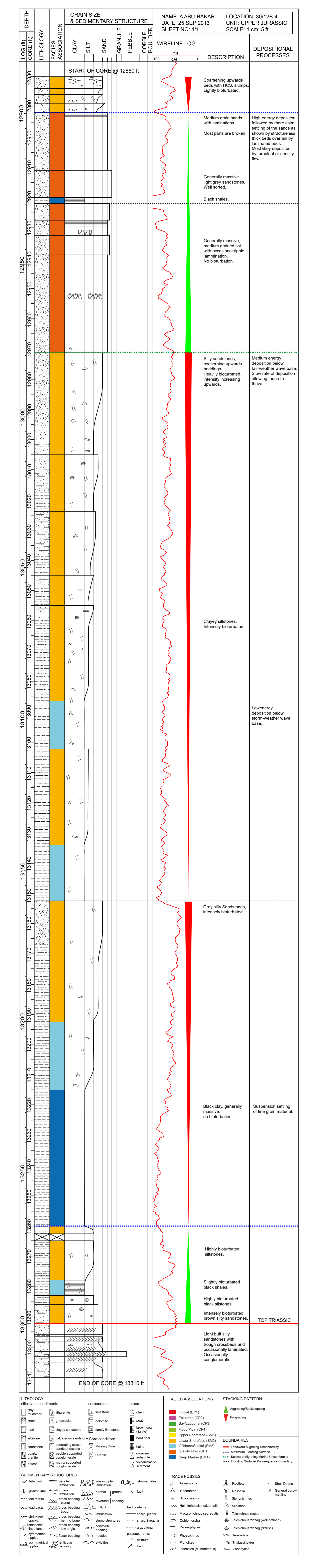
- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling


NAME: A-ABU-BAKAR
DATE: 25 SEP 2013
SHEET NO: 1/1
LOCATION: 30/12B-4
UNIT: UPPER JURASSIC
SCALE: 1 cm: 5 ft
GRAIN SIZE & SEDIMENTARY STRUCTURE
CLAY
SILT
SAND
GRANULE
PEBBLE
COBBLE
BOULDER
WIRELINE LOG
GR
100 API 0
LOG (ft)
DEPTH
CORE (ft)
LITHOLOGY
FACIES ASSOCIATION
DESCRIPTION
DEPOSITIONAL PROCESSES
START OF CORE @ 12880 ft
Coarsening upwards beds with HCS, slumps. Lightly bioturbated.
Medium grain sands with laminations.
Most parts are broken.
High energy deposition followed by more calm setting of the sands as shown by structureless thick beds overlain by laminated beds.
Most likey deposited by turbulent or density flow.
Generally massive light grey sandstones. Well sorted.
Black shales.
Generally massive, medium grained sst with occasional ripple lamination.
No bioturbation.
Silty sandstones, coasening upwards beddings.
Heavily bioturbated, intensity increasing upwards.
Medium energy deposition below fair-weather wave base. Slow rate of deposition allowing fauna to thrive.
Clayey siltstones, Intensely bioturbated
Lowenergy deposition below storm-weather wave base.
Grey silty Sandstones, intensely bioturbated.
Black clay, generally massive.
no bioturbation
Suspension settling of fine grain material.
Highly bioturbated siltstones.
Slightly bioturbated black shales.
Highly bioturbated black silstones.
Intensely bioturbated brown silty sandstones.
TOP TRIASSIC
Light buff silty sandstones with trough crossbeds and occasionally laminated. Occasionally conglomeratic.
END OF CORE @ 13310 ft
LITHOLOGY
siliciclastic sediments
clay, mudstone
shale
marl
siltstone
sandstone
quartz arenite
arkose
sltharenite
greywacke
clayey sandstone
calcareous sandstone
alternating strata sandstone/shale
pebble-supported conglomerate
matrix-supported conglomerate
carbonates
limestone
dolomite
sandy limestone
Core condition:
Missing Core
Rubble
others
chert
peat
brown coal (lignite)
hard coal
halite
gypsum-anhydrite
volcaniclastic sediment
FACIES ASSOCIATIONS
Fluvial (CP1)
Estuarine (CP2)
Bay/Lagoonal (CP3)
Flood Plain (CP4)
Upper Shoreface (SM1)
Lower Shoreface (SM2)
Offshore/Shelfal (SM3)
Gravity Flow (GF1)
Deep Marine (DM1)
STACKING PATTERN
Aggrading/Backstepping
Prograding
BOUNDARIES
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Maximum Flooding Surface
Seaward Migrating Marine Unconformity
Flooding Surface/ Parasequence Boundary
SEDIMENTARY STRUCTURES
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groove cast
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load casts
shrinkage cracks
striations/ lineations
symmetrical ripples
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parallel lamination
cross-lamination
cross-bedding- planar
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cross-bedding- low angle
flaser bedding
lenticular bedding
wave-ripple lamination
normal
reversed
graded bedding
HCS
imbrication
slump structures
convolute bedding
nodules
stylolites
stromatolites
fault
bed contacts:
sharp, planar
sharp, irregular
gradational
palaeocurrents:
azimuth
trend
TRACE FOSSILS
Asterosoma
Chondrites
Diplocraterion
Helminthopsis horizontalis
Macaronichnus segregatis
Ophiomorpha
Palaeophycus
Phoebichnus
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Planolites (cf. montanus)
Rootlets
Rosselia
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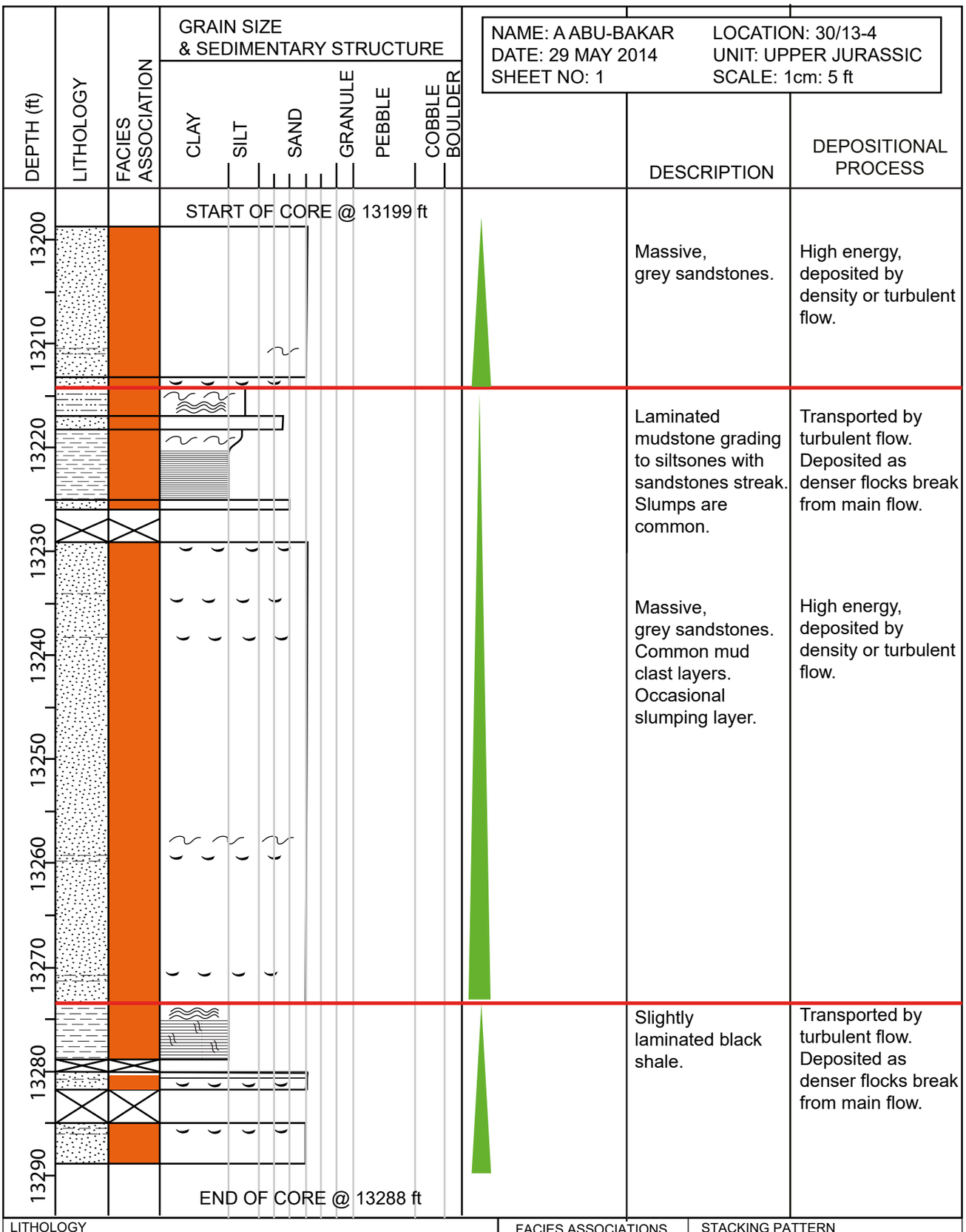
Shell Debris
General burrow mottling



LITHOLOGY

siliciclastic sediments

- clay, mudstone
- shale
- marl
- siltstone
- sandstone
- quartz arenite
- arkose
- litharenite
- greywacke
- clayey sandstone
- calcareous sandstone
- alternating strata sandstone/shale
- pebble-supported conglomerate
- matrix-supported conglomerate

carbonates

- limestone
- dolomite
- sandy limestone

Core condition:

- Missing Core
- Rubble

others

- chert
- peat
- brown coal (lignite)
- hard coal
- halite
- gypsum-anhydrite
- volcaniclastic sediment

FACIES ASSOCIATIONS

- Fluvial (CP1)
- Estuarine (CP2)
- Bay/Lagoonal (CP3)
- Flood Plain (CP4)
- Upper Shoreface (SM1)
- Lower Shoreface (SM2)
- Offshore/Shelfal (SM3)
- Gravity Flow (GF1)
- Deep Marine (DM1)

STACKING PATTERN

- Aggrading/Backstepping
- Prograding

BOUNDARIES

- Landward Migrating Unconformity
- Maximum Flooding Surface
- Seaward Migrating Marine Unconformity
- Flooding Surface/ Parasequence Boundary

SEDIMENTARY STRUCTURES

- flute cast
- groove cast
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- parallel lamination
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- HCS
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- slump structures
- convolute bedding
- nodules
- stylolites
- stromatolites
- fault
- shale clast

bed contacts:

- sharp, planar
- sharp, irregular
- gradational

palaeocurrents:

- azimuth
- trend

TRACE FOSSILS

- Asterosoma
- Chondrites
- Diplocraterion
- Helminthopsis horizontalis
- Macaronichnus segregatis
- Ophiomorpha
- Palaeophycus
- Phoebichnus
- Planolites
- Planolites (cf. montanus)
- Rootlets
- Rosselia
- Siphonichnus
- Skolithos
- Teichichnus rectus
- Teichichnus zigzag (well defined)
- Teichichnus zigzag (diffuse)
- Terebellina
- Thalassinoides
- Zoophycos
- Shell Debris
- General burow mottling