

Depositional Facies of Plover Formation in the Abadi Field, Eastern Indonesia Based on Core Sedimentology*

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Abstract

A core sedimentology study was made on the reservoir interval of the Middle Jurassic Plover Formation of the Abadi Field in the Masela PSC block located in Eastern Indonesian water ([Figure 1](#)) to investigate the facies variation of the field.

Discussion

The Plover Formation in the Abadi field consists of sandstone, siltstone, and mudstones, which have been considered as paralic to offshore in origin. The sedimentological description and analysis, mainly on ichnology, was done on the conventional cores (20 cored intervals with total core recovery of 172.3 m) recovered from the Plover Formation in the six wells in the field ([Figure 2](#)).

The cores consist of very fine to coarse-grained quartzose sandstone, siltstones, and claystones/mudstones, which are generally rich in ichnofossil content. From the core observation, six lithofacies (LFs) were identified based on lithology, primary/secondary sedimentary structures and ichnofossil assemblages:

- LF-1, which consists of medium to coarse grained, massive and amalgamated quartzose sandstone with cryptic bioturbation, is interpreted to have deposited in an estuary channel.

- LF-2, which consists of fine to medium grained, massive and structureless quartzose sandstone with more marine ichnofossils such as *Chondrites*, *Phycosiphon*, *Scolicia*, and *Skolithos*, is interpreted to have been deposited in an upper shoreface setting.
- LF-3, which consists of alternating fine sandstones and siltstones with parallel lamination and planar cross stratification, wavy and flaser structures, and common small *Chondrites*, *Palaeophycus*, *Planolites* and *Thalassinoides*, is interpreted to have been deposited in a protected marine setting.
- LF-4, which consists of inter-laminated mudstone and thin layers of siltstone with parallel lamination, wavy and flaser structures, and with small *Chondrites*, *Planolites*, *Ophiomorpha*, and *Thalassinoides* ichnofossils, is interpreted to have been deposited in a more basinal part of a protected marine setting than LF-3.
- LF-5 consists of alternating fine to medium sandstone/siltstone/mudstone with parallel lamination, wavy and flaser structures, and local tempestite structures. LF-5 has highly burrowed ichnofossils such as *Phycosiphon*, and *Scolicia*, with *Asterosoma*, *Bergaueria*, *Chondrites*, *Cylindrichnus*, *Diplocraterion*, *Lockeia*, *Rhizocorallium*, *Rosselia*, *Skolithos*, *Thalassinoides*, *Teichichnus*, and *Trichichnus*. This lithofacies is interpreted to have been deposited in a lower shoreface setting.
- LF-6 is consisted of interbedded siltstone and mudstone with slump/load cast/disorganized structures, graded bedding, laminated and cross-laminated lithoclasts deposited as gravity flows/ turbidites. No ichnofossils are found. This lithofacies is interpreted to have been deposited in a prodelta setting.

List of lithofossils identified in the Plover Formation in the Abadi field is summarized in [Table 1](#).

Conclusion

Stratigraphic correlation of the wells ([Figure 3](#)) indicates that all sandstones of Plover Formation are connected each other, but this study indicates that it can be a complex amalgamation of the variety of lithofacies/depositional facies.

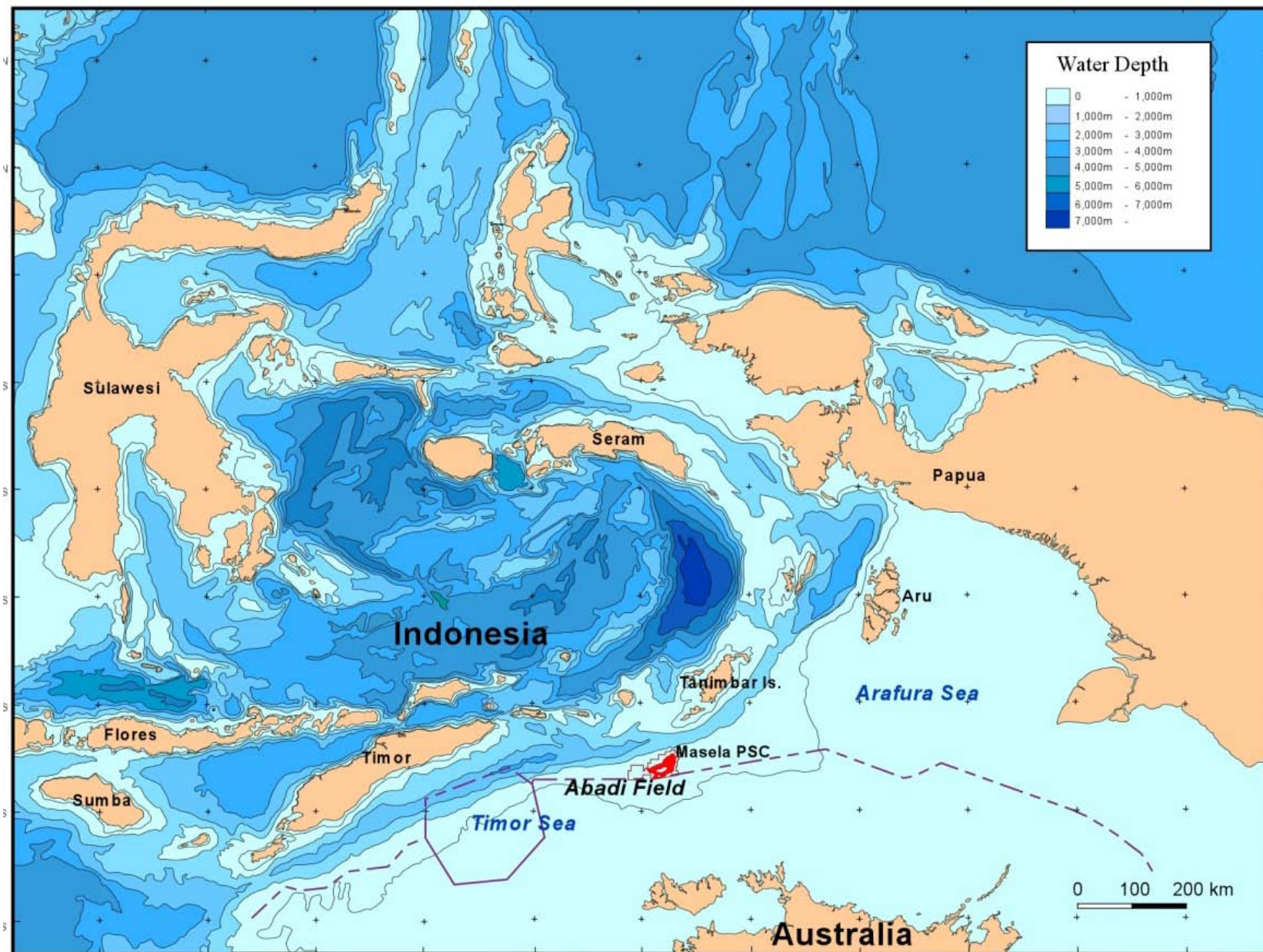


Figure 1. Location of the Abadi Gas Field.

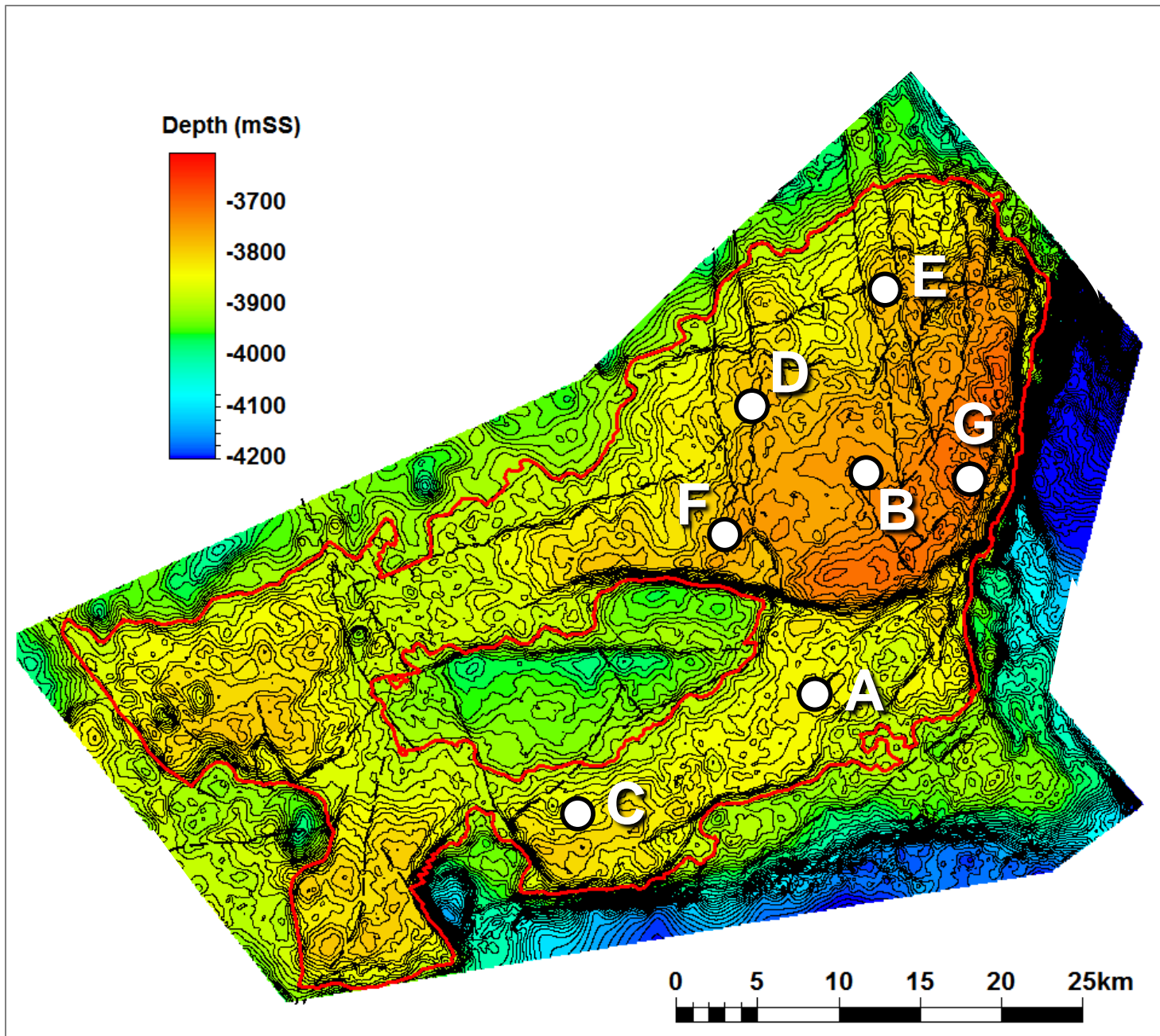


Figure 2. Well location in the Abadi gas field with the top of Plover Formation depth structure map.

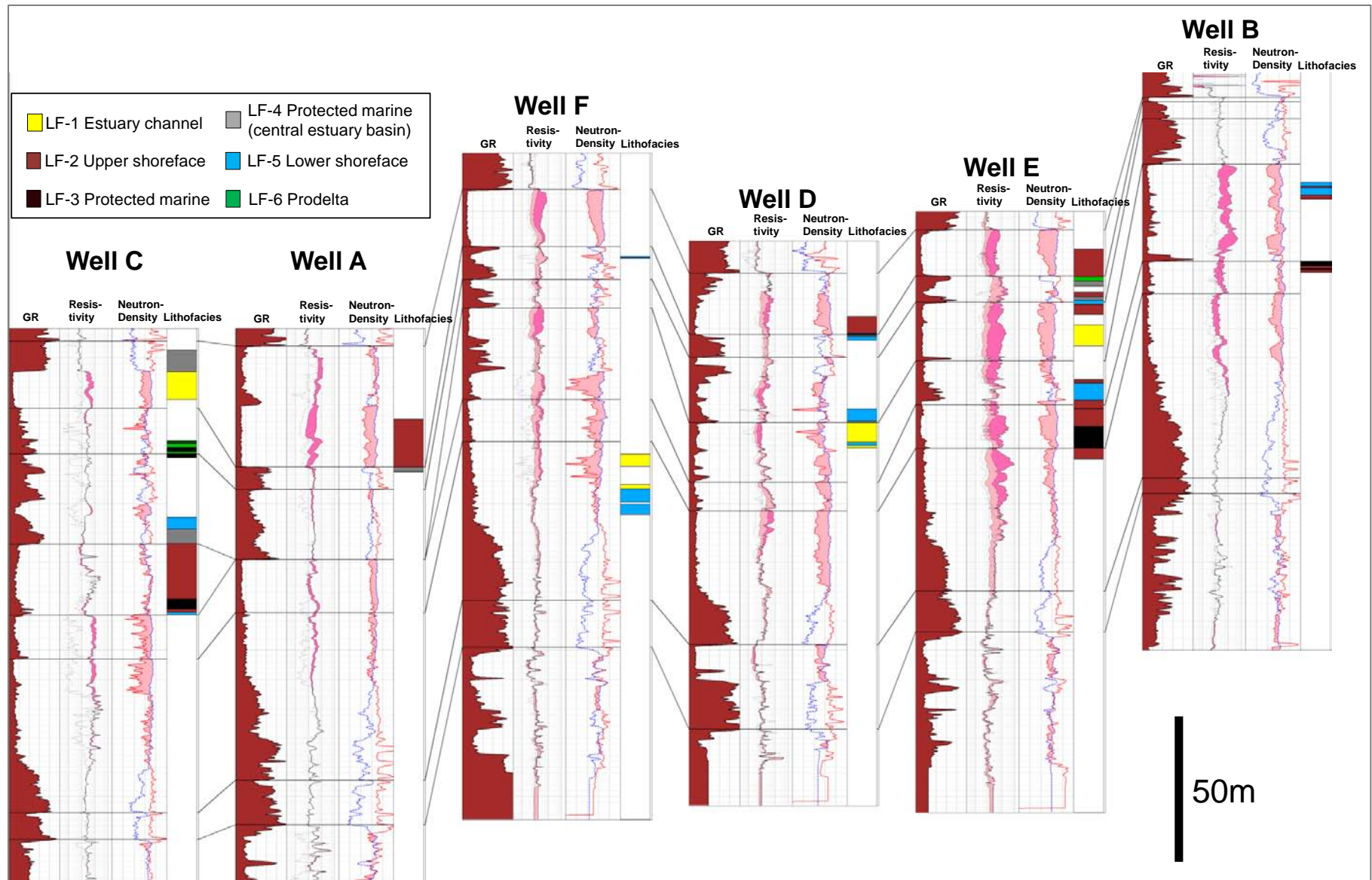


Figure 3. Well correlation in the Abadi field with the interpreted lithofacies (LFs)

No	ICHNOFOSSIL	LF-1/ estuary channel	LF-2/ upper shoreface	LF-3/ protected marine	LF-4/ more basinal part of protected marine	LF-5/ lower shoreface	LF-6/ prodelta
1.	<i>Arenicolites</i>	X	X	X	X	V	X
2.	<i>Asterosoma</i>	X	X	X	X	V	X
3.	<i>Bergaueria</i>	X	X	X	X	V	X
4.	<i>Chondrites</i>	X	V	V	V	V	X
5.	<i>Lockeia</i>	X	X	X	X	V	X
6.	<i>Cylindrichnus</i>	X	X	X	X	V	X
7	<i>Diplocraterion</i>	X	X	X	X	V	X
8.	<i>Ophiomorpha</i>	V	V	V	V	V	X
9.	<i>Planolites</i>	V	V	V	V	V	X
10.	<i>Palaeophycus</i>	X	X	V	X	X	X
11.	<i>Phycosiphon</i>	X	V	X	X	V	X
12.	<i>Rhizocorallium</i>	X	X	X	X	V	X
13.	<i>Rosselia</i>	X	X	X	X	V	X
14.	<i>Scolicia</i>	X	V	X	X	V	X
15.	<i>Skolithos</i>	X	V	X	X	V	X
16.	<i>Thalassinoides</i>	X	X	V	V	V	X
17.	<i>Teichichnus</i>	X	X	X	X	V	X
18.	<i>Terebellina</i>	X	X	X	X	V	X
19.	<i>Trichichnus</i>	X	X	X	X	V	X
20.	<i>Zoophycos</i>	X	X	X	X	V	X
21.	<i>Glossifungites</i>	V	V	X	X	X	X
22.	<i>Cryptic bioturbation</i>	V	V	X	X	X	X
23.	<i>Rootlet</i>	X	V	X	X	V	X

Table 1. List of lithofossils identified in the Plover Formation in the Abadi field.