

COAL GEOLOGY & COAL DEPOSITIONAL OF KEBAN AREA, LAHAT SUBDISTRICT

by Basuki Rahmad

Submission date: 03-Apr-2023 02:56PM (UTC+0700)

Submission ID: 2054427629

File name: AL_DEPOSITIONAL_OF_KEBAN_AREA,_LAHAT_SUBDISTRICT_2019_text_1.pdf (3.07M)

Word count: 1792

Character count: 9351

Coal Geology and Coal Depositional Environmental of Keban Area, Lahat Sub-District, South Sumatera, Indonesia

Basuki RAHMAD¹, Sugeng RAHARJO¹, EDIYANTO¹, Fadhil ZUHDI¹, Indra DARMAWAN¹.

¹Department of Geological Engineering, Faculty of Technology Mineral, University of Pembangunan Nasional "Veteran" Yogyakarta, Indonesia

Email first author: b_rahmad2004@yahoo.com; basukirahmad@upnyk.ac.id

ABSTRACT

Regionally, the study area belongs to the Syn Orogenic tectonic phase (Ginger and Fielding, 2005). This phase causes the formation of structural traps for hydrocarbons in the South Sumatra Basin. Coal bearing formation in the research area is the Late Miocene - Pliocene included Muara Enim Formation. In the Late Miocene Period there was an increase in volcanic activity in the Bukit Barisan Mountains where most of the volcanic sediment material in the form of tuffaceous sandstone and tuffs filled the Muara Enim formation. The structure that develops in the study area is the plunging anticline which is relatively E-W with a bedding of dipping of the southern between 37°-58° and north wing between 28°-37° with angle of plunging 24°. Coal distribution pattern of the study area follows of the plunging anticline pattern.

The geological map of the study area consists of 2 rock units are: Muara Enim Sandstone Unit with sandstone lithology, carbonaceous sandstone and tuffaceous sandstone, massive structure, wavy laminated, intercalation of thin coal (0.2m - 0.6m). The Muara Enim Claystone Unit consists of interbedded of carbonaceous claystone, claystone, intercalation of coal, sandstone and tuffaceous sandstone, cross-lamination structure, bedding flaser, coal thickness between 3 - 10 meters. The coal depositional environmental of the Keban area and its surroundings is deposited in delta plain through a regression phase with the presence of multiple seam coal. The coal quality of the Keban Area: Caloric Value 5347-5504 kcal / kg, Inherent Moisture (23.6%), Ash (4%), Volatile Matter (32.1%), Fixed Carbon (40%), Total Sulphur (0.5%) including Sub-Bituminous Coal.

Keywords: syn-orogenic, plunging anticline, flaser bedding, delta plain, multiple seam, sub-bituminous coal.

INTRODUCTION

Physiographically, the South Sumatra Basin is a northwest-southeast trending Tertiary basin, bordered by the Semangko Fault and Bukit Barisan to the southwest, Sunda Exposure to the northeast, Lampung Height to the southeast that separates the basin from the Sunda Basin, and the Twelve Mountains and The Thirty Mountains to the northwest separating the South Sumatra Basin from the Central Sumatra Basin (Van Bemmelen, 1949). The South Sumatra Basin is a Tertiary-aged back arc basin formed as a result of an interaction between the Sundanese Exposure (as part of the Asian mainland plate) and the Indian Ocean plate. This basin area covers an area of 330 x 510 km², where the southwest is bounded by the Bukit Barisan Pre-Tertiary outcrop, to the east by the Sunda Shield (Sunda Shield), to the west is bounded by the Tigapuluh

Mountains and to the southeast is bounded by Lampung High (Wisnu & Nazirman, 1997).

According to Ginger & Fielding (2005), the history of the South Sumatra Basin is divided into three tectonic Megasequences that form the structural framework of the South Sumatra Basin region, namely the Megasekuen Syn-Rift, Megasekuen Post-Rift, and Megasequences Inversion / Syn Orogenic. Stratigraphy The South Sumatra Basin is generally known as a megacycle consisting of a transition and regression. Formations formed during the transgression phase are grouped into the Telisa Group (Talangakar Formation, Baturaja Formation, and Gumai Formation). The Palembang group was deposited during the regression phase (Airbenakat Formation, Muaraenim Formation, and Kasai Formation),

while the Lemat Formation and Old Lemat Formation were deposited before the main transgression phase (Ginger, 2005).

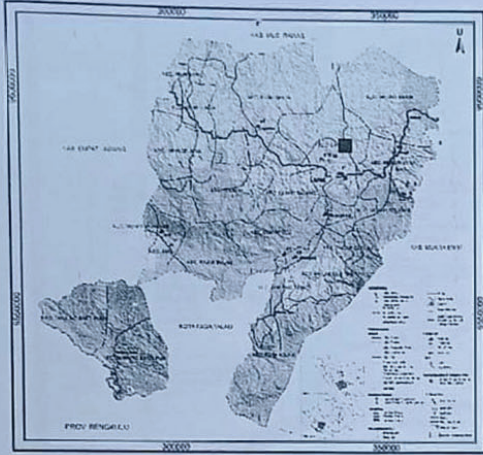


Figure 1. Research area based on Lahat District infrastructural map

This research was conducted to determine the microscopic composition of coal based on the mecerals composition and changes in maturity (coal rank), so that by microscopy can be known organic components of coal as additional data that will support the use of coal, especially the potential of coal methane gas resources.

GEOLOGICAL LOCAL CONDITIONS

Stratigraphically the Keban Area is included in the Muaraenim Formation which is composed of 2 successive rock units from old age, namely the Muara Enim sandstone unit and the Muara Enim claystone unit. The top and bottom are characterized by the appearance of a continuous layer of coal laterally. This formation has a thickness of between 263 m which is calculated using logs in the study area. This rock unit has the age of Late Miocene - Pliocene which was determined using palinological analysis with the characteristic Fossil Pollen *Florzhuetzia*

meridionalis (Rahardjo, et, al 1994). Based on the sedimentary structure developed in this rock unit and the interpretation of drill log data, this unit was deposited in the Lower Delta Plain environment with a tidal distributary channel sub-environment, referring to Allen & Chambers in 1998. Image of the depositional environment The Muaraenim sandstone unit refers to the Allen & model Chambers (1998). The research area is composed of Muara Enim Sandstone Unit consist of sandstone with flaser structure, sandstone with carbon laminae, glauconitic sandstone, with coal inserts and Muaraenim claystone unit consist of carbonaceous sandstone, claystone with lenticular structure, lamination of claystone, tuffaceous sandstone, with coal inserts. In the research area there are 3 coal seams, namely seam coal A (A upper and A lower), seam coal B, and seam coal C. Coal in the study area is included in the Subbituminous rank.

The major geological structure that developed in the Keban Area is an anticline that has a relatively west-east direction with a north-south relative direction flank.

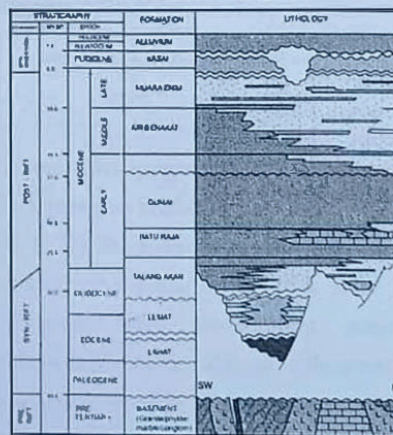


Figure 2. Stratigraphic of South Sumatera Basin (Ginger and Fielding, 2005)

the following depositional episodes can be recognized: 1) Syn-rift and Associated Rift-valley Depositional (Eocene-Oligocene), 2) 'Post-rift' Transgressive Phase Deposition (Oligocene-Early Miocene), 3) Syn-orogenic Regressive Phase Deposition. The term syn-rift depositional is limited to deposition of the rift-valley basin during active rifting (initial and climatic phase of Prosser, 1993, syn-rift of Lambiase, 1990, Lambiase & Morley, 1999) while subsequent filling of the Rift-Valley basin is referred to as post-rift deposition. Lambiase (1990) shows in his diagram that fluvial deposition took place at the end of syn-rift fill as well as in the subsequent post-rift fill of the rift-valley. This is presumably what is referred to as Early Post-rift and Late Post-rift deposition of Prosser. Coal is deposited in the deltaic environment in the flexural side of the half graben and the fluvial environment toward the end of active rifting as well as in the post-rift fluvial environment. In this paper the term syn-rift and associated rift-valley deposition will be referred to as 'syn-rift deposition', while the term post-rift will be used in the subsequent tectonic environment of wide-spread general subsidence, often called 'sag' in the Indonesian geology literature.

Back-arc Basin Setting: In South Sumatera, syn-orogenic regression-related coal seams are extensively developed in the deltaic deposition of the Miocene-Pliocene Muara Enim Formation, where over 10 coal seams are present, with maximum thickness exceeding 20 m (Suban Coal Seam) (Taupitz, 1988). Over 20 coal occurrences have been discovered around the Tanjung Enim field where the coal is being mined. Average calorific value is 5504 to 5347

kcal/kg (as received) and total moisture content: 23.6% (as received), sulphur content of 0.5% Ash 4%, VM 32.1% and FC: 40.3% at Tanjung Enim some of the coal has been ameliorated by andesitic intrusion into anthracite with CV of 8000 kcal/kg.

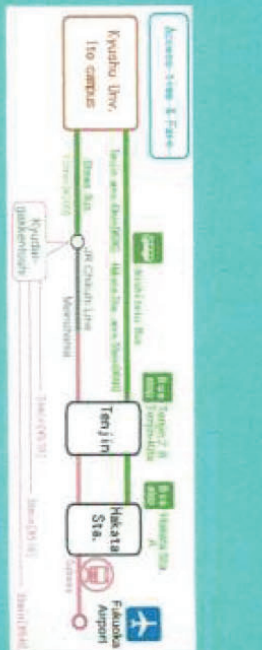
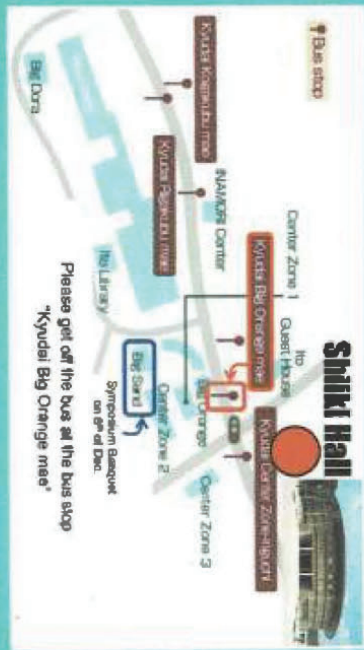
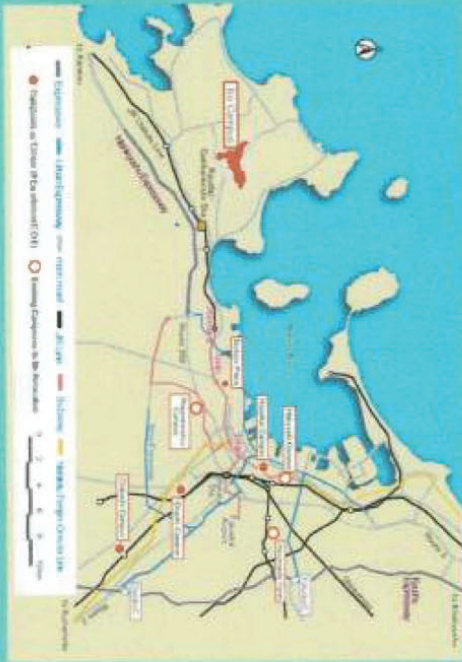
CONCLUSION

Based on the developing sedimentary structure and interpretation of the drilling log carried out in the Muara Enim sandstone unit, the unit is deposited in the Lower Delta Plain environment in the tidal distributary channel sub-environment. Age of Muaraenim Sandstone Unit based on palynological analysis has Late Pliocene-Miocene age. There are 4 coal seams in Keban Area, namely seam coal A (A upper and A lower), seam coal B, seam coal C that including in Subbituminous rank.

REFERENCES

- Allen, G.P. & Chambers, J.L.C., 1998. Sedimentation in the Modern and Miocene Mahakam Delta, IPA.
- Ginger, D., Fielding, K., 2005. *The Petroleum System and Future Potential of The South Sumatera Basin*. Proceedings Indonesian Petroleum Association, 30 Annual Convention & Exhibition, Indonesian Petroleum Association
- Wisnu & Narziman., 1997. Geologi Regional Sumatra Selatan., Pusat Survei Geologi dan Badan Geologi Kementrian ESDM.
- Rahardjo, DKK., 1994, ZONASI POLIEN TERSIER PULAU JAWA. Makalah Ikatan Ahli Geologi Indonesia. Pertemuan Ilmiah ke 23.
- Koesoemadinata., 2002. Outline of Tertiary Coal Basins Of Indonesia. Sedimentology Newsletter, Number 17/1/2002. Published

- by The Indonesian Sedimentologist Forum,
the sedimentology commission of the
Indonesian Association of Geologist.
- Shell Minjbouw., 1978., *Stratigrafi dan Struktur
Geologi.*, Peta Geologi Lembar Baturaja
- J.J. Lambiase & Christopher K.Morley., (1990).
Hydrocarbons in rift basins: The role of
Stratigraphy., *Philosophical Transactions
of The Royal Society A Mathematical
Physical Sciences.*



COAL GEOLOGY & COAL DEPOSITIONAL OF KEBAN AREA, LAHAT SUBDISTRICT

ORIGINALITY REPORT

0%

SIMILARITY INDEX

0%

INTERNET SOURCES

0%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

Exclude quotes On

Exclude bibliography On

Exclude matches < 10%