Coalification of Some Coal Basins of Mongolia

Ongi River Coal-Basins

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Starting from the end of 1960’s, Mongolia has begun the intensive as well as more detailed studies with respect to the geology of sediments, deposits, and basins of mineral fuels. Studies on the coking coals and the petrography started from 1970’s and evaluation studies on the reserves of coal and peat started from the end of 1960’s. To date, there are 12 coal basins where over 200 coal deposits and occurrences are discovered; in general these deposits and occurrences equally located over the territory of this country and coal reserves are thought to be of over 150 billion tonnes.
Ongi Coal-Basins
Ongi River of Coalification, Schema of diffusion

Z.Tumurbaatar and G.Yondongombo
Geological image of Coal-Field, Bayanteg

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Image 5. 22th line of cross cut
### Result of Laboratory analysis

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Damp (W^a)%</td>
<td>0.7-12.5</td>
</tr>
<tr>
<td></td>
<td>510-2,2</td>
</tr>
<tr>
<td>Culm (A^d)%</td>
<td>63,4-5.0</td>
</tr>
<tr>
<td></td>
<td>510-22.6</td>
</tr>
<tr>
<td>Flammable Gas (V^{dah})%</td>
<td>39.1</td>
</tr>
<tr>
<td></td>
<td>212</td>
</tr>
<tr>
<td>Sulphuric Contents (S^d_t)%</td>
<td>0.27-3.5</td>
</tr>
<tr>
<td></td>
<td>163-1,01</td>
</tr>
<tr>
<td>Calorie (Q^{da}}) kcal / kg</td>
<td>4900-9010</td>
</tr>
<tr>
<td></td>
<td>192-7230</td>
</tr>
<tr>
<td>Working Damp (W^f)%</td>
<td>3.33-8.5</td>
</tr>
<tr>
<td></td>
<td>11-5, 17</td>
</tr>
<tr>
<td>Volume Balance (\delta) g/cm²</td>
<td>1.28-1.5</td>
</tr>
<tr>
<td></td>
<td>11-1,3</td>
</tr>
<tr>
<td>Rate (\gamma) g/cm³</td>
<td>1,3-1.8</td>
</tr>
<tr>
<td></td>
<td>306-1,57</td>
</tr>
</tbody>
</table>
Coalification of Kharkhiraa Coal-Basins
The Kharkhiraa Coal-Bearing Basin

The province of the western Mongolia occupies an area of 280 thousand square kilometers spanning over the ranges of Altai and Kharkhiraa Mountains Range while bordering via the state borderline with Russian Federation on the north and the People’s Republic of China on the west and via land area with the Khangai Mountaineous Range on the east. The northern part of this province constitutes of a total of 60 thousand square kilometers area. It borders with the western part of Uvs Aimag, the Kharkhiraa Mountains, the northwestern part of the Great Lakes Depression, the Khar Nuur Lake and the Baga Khar Nuur Lake on the south, the Achit Nuur Lake on the right, and Khan Khukhii Mountaineous Range on its southeast. This basin has carboniferious sections of Kharkhiraa-Turgen, Termes Uul-Khuden, and Khyargas Nuur Lake regions.
Зураг 1

Нуурыс хүрмтлалын хархираагийн сав газаар

масштаб 1:2,500000

Таних тэмдэг

1. Монгол улсын хил
2. Нуурыс хүрмтлалын их мүжийн хил
3. Нуурыс хүрмтлалын сав газрын хил
4. Нуурыс хүрмтлалын талбайн хил
1. Хархираагийн сав газрын нуурагилт бухий хурдасны тархалтын райончлолын схем

1-1. Байрли-Түрэнний район
1-2. Тэрөмс уул-Худэнгийн район
1-3. Хяргас нуурны район
Coal Deposits and Occurrences

1. Nuurst Khotgor
2. Indert
3. Khetiin Khutul
4. Khargiin Gol
5. Bayanmat
6. Iljgen Gol
7. Khartarvagatai
8. Myangan
9. Burgastain Gol
10. Khargait
11. Yavar
12. Khuden
13. Maikhan Uul
14. Occurrences 1-3
15. Baitsatyn Gol

Z.Tumurbaatar and G.Yondongombo
1 Contemporary alluvial and proluvial deposit
2 Contemporary unsorted alluvial, proluvial, lacustrine, and river deposit
3 Lower Pliocene, Altanteel formation, sand, aleurolite, clay, and marl
4 The Upper Jurassic-Lower Cretaceous. Gurvan Ereen formation, argillaceous schist, sandstone, gravellite, and conglomerate
5 The Upper Jurassic. Ikhes nuur formation, conglobreccia, gravellite, sandstone, aleurolite, clay, and coal
6 The Lower-Middle Jurassic. Jargalant formation. Conglomerate, sandstone, aleurolite, argillite, and coal
7 The Middle-Upper Carbon. Uliastai formation. Conglomerate gravellite, coalstratal sandstone, and gravellite sandstone
8 The Lower Carbon. Shanaga bulag formation. Sandstone, aleurolite, limestone, conglomerate, and coal
9 The Middle-Upper Devonian. Khatuu gol formation. Argillaceous schist, sandstone, and aleurolite
10 The Middle Devonian. Aduunchuluun formation. Conglomerate, sandstone, and aleurolite
11 The Lower-Middle Devonian. Yamaat gol formation. Sandstone, aleurolite, argillaceous schist, and limestone
12 The Lower Silurian. Unsorted sediment. Sandstone, conglomerate, gravellite, aleurolite, and limestone
13 The Middle-Upper Ordovician. Unsorted sediment. Sandstone, aleurolite, siliceous tuffite, limestone, middle to basic tuffite
14 The Lower-Middle Ordovician. Unsorted sediment. Andesitebasalt, andesite, rhyolite, their tuffs, tuffconglomerate, tuff sandstone, gravellite, siliceous tuffite, and aleurolite
15 The Lower-Middle Cambrian. Unsorted sediment. Tuffite and grey wacky sandstone, andesite, andesite-basalt, their tuffs, siliceous schist, tuff gravellite, and aleurolite
16 The Vendian-Lower Cambrian. Jivert Gol formation. Metasandstone, gravellite, aleurolite, fillite, chlorite-sericite, carboniferous and siliceous schist, jaspoid quartzite, limestone, basic and alkaline meta-effusive
17 The Upper Riff. Granite-biotite, biotite, biotite-amphibolite, carboniferous and sericite schist, meta-sandstone, meta gravellite, and meta conglomerate.
18 The Middle-Upper Carbon. Gabbro, gabbrodiabase, gabbrodiorite, and diorite intrusive complex
19 The Upper Devonian. Kharkhiraagiiin granite, and leuco granite intrusive complex
20 The Middle Ordovician. Granodiorite, granite, diorite intrusive complex
22 The Middle-Upper Cambrian. Plagiogranite intrusive complex.
23 The tectonic fracture

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The Coal Quality

The coals are black, with pleated structure, coal surfaces range from bright to semi-bright to dull. Table below shows indicators of coal quality.

<table>
<thead>
<tr>
<th>Sampling wells and trenches</th>
<th>Sample Number</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( W )</td>
</tr>
<tr>
<td>1. Trench No.25</td>
<td>11</td>
<td>7.95</td>
</tr>
<tr>
<td>2. Trench No.28</td>
<td>4</td>
<td>7.27</td>
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<td>3. Trench No.29</td>
<td>2</td>
<td>7.36</td>
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<td>4. Trench No.32</td>
<td>4</td>
<td>7.50</td>
</tr>
<tr>
<td>5. Trench No.36</td>
<td>2</td>
<td>8.24</td>
</tr>
<tr>
<td>6. Trench No.30</td>
<td>2</td>
<td>8.06</td>
</tr>
<tr>
<td>7. Trench No.31</td>
<td>2</td>
<td>7.53</td>
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<td>8. Trench No.40</td>
<td>4</td>
<td>7.96</td>
</tr>
<tr>
<td>9. Trench No.41</td>
<td>3</td>
<td>7.38</td>
</tr>
<tr>
<td>10. Trench No.42</td>
<td>2</td>
<td>8.37</td>
</tr>
<tr>
<td>11. Trench No.43</td>
<td>2</td>
<td>9.53</td>
</tr>
<tr>
<td>12. Trench No.44</td>
<td>2</td>
<td>8.14</td>
</tr>
</tbody>
</table>
The Nuurstkhotgor coal deposit
The Economics and Geographic Location of the Deposit
The Nuurstkhotgor coal deposit is located in 70 kilometers northeast of Bukhmurun Soum Center of Uvs Aimag, 180 kilometers west of Ulaangom town, and 140 kilometers northeast of Ulgii town. The geographic coordinates of this locality are 90°54'00" degrees of eastern longitude and E49°50'00" degrees of northern latitude. It is at the northern shore of Achit Nuur Lake depression, and the front foot of Bairam and Khalchig Mountains at elevations of 2050-2100 meters above sea level.

![Diagram of geological profile along with B-B line](image)

**Figure 5**
Geological Profile along with B-B line

Legends:
- Coal horizons and level
- Prospecting borehole, and its number
- Borehole at profile, and its number
- Prospecting line
- Tectonic fracture
Nuurst Khotgors Occurrence

Map Scale 1:26250

Picture - 4
Khartarvagatai Coal Deposit
The Geological Structure

Figure 7.
The Geological Map of Khartarvagatai Coal Deposit
Scale: 1:40 000
II-III Cross cut of anaseismic

- Coal Horizons
- Tectonic fracture
- Channel or trench
- Bore pit
- Borehole, its number
- Exploratory line
Conclusion on Coalification in Kharkhiraa Basin

- The geology of Kharkhiraa coal basin has a complex structure. There is a distribution of sediments from the oldest Cambrian to the Contemporary Period, and amongst there are the carbonaceous sediments from the Middle-Upper Carbon and the Lower-Middle, and Upper Jurassic Periods.

- The sediments of the Middle-Upper Carbon, Lower-Middle, and Upper Jurassic Periods are located within the folding system of Tsagaan Shiveet and Mongol Altai Structural Formation Zone that stretches from 20 kms to 60 kms in its length. They were dissected through by a tectonic fracture that passes from the southeast towards the northwest and had been separated from each other. The latter process led to the creation of separately positioned lenticular blocs.

- In contrast, the Termis-Khudengiin Region has been created in geologically more calm structural zone of Tuva and it makes to differ it from the other.
Sediments of the Middle-Upper Carbon are observed at Bairam, Turgen Mountain Areas and also at around of Khudengiin Khuduu but sediments of the Jurassic Period are observed at the depressions of both Khyargas Nuur Lake and Uureg Nuur Lake and on the northern bounds of Uureg Nuur Lake areas.

There is a high probability of its creation at the superimposed basin if it is based on the characters of distribution of the Middle-Upper Carbon period area with coalification, its thickness, composition of facies, coalification characteristics, and its quality. The Uliastai Formation of the Middle-Upper Carbon Period is characterized by partings or branching of coalification and non-coalification series, and predominance of thin coal layers. In addition, number of coal horizons are few, and their thicknesses are not great, and coals with complex structure are distributed over the limited area and they are generally marked as Type D and G.

The lenticular, dissected from each other, blocs, are usually have smaller area which are attributable to abyssal and hypabyssal tectonic fracture as result of intensive folding processes taking place at this region.
THANK YOU FOR ATTENTION