The potential of Negeri Atas Angin Geosite Bojonegoro

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Abstract. Bojonegoro has so many natural wealth and natural beauty. One of the proof of natural beauty in Bojonegoro is the Negeri Atas Angin. Negeri Atas Angin is located in Deling Village, Sekar District, Bojonegoro City. Its location is in altitude, that we can see the condition of the surrounding area such as Mount Pandan and can be a great place to see the sunrise and sunset. In this area, there are two types of rocks, clastic limestone and tuffan sandstones resulting from volcanic products (Figure 4). This area is located in Kendeng Zone, which based on geological map is Member of the Upper Angle of Kalibeng Formation of the Early Pliocene (3.6 mya). The condition of the area is composed of clastic limestone lithology which has a layered sedimentary structure with several calcite mineral. The limestone supports tuffan sandstone. The position of the limestone layer N155°E / 30°. Based on the analysis, Negeri Atas Angin has the potential to be developed, not only for Nature Tourism but also can be used for Geological Tourism (Geotourism) because it is useful for improving the economy of the surrounding community, introducing Negeri Atas Angin, and also increasing the popularity of Nature Tourism Geology in strengthening National Geopark of Bojonegoro.

Keywords : Bojonegoro, Geotourism, Geoheritage, Negeri Atas Angin, National Geopark of Bojonegoro

1. Introduction
Not running out of tourism object after Bojonegoro City has National Geopark of Bojonegoro, but Bojonegoro still has various kinds of Tourism Potential which has the beauty of nature and geological aspect. One of the proofs of natural beauty in Bojonegoro is the Negeri Atas Angin. Negeri Atas Angin is in the village Deling, District Sekar, Bojonegoro. Negeri Atas Angin is one of Geosite's potential in Bojonegoro because Negeri Atas Angin is unique and it has geological aspect. Negeri Atas Angin has a difference with Geosites in the National Geopark of Bojonegoro, The place which is on the altitude makes Negeri Atas Angin nice to see the scenery around and see sunrise and sunse.

Development of Negeri Atas Angin Geosite is needed to introduce Negeri Atas Angin on National-International tourism, Improving the economy of local community, and Strengthen the National Geopark of Bojonegoro.

2. Research Metodology
There are several steps in our research in determining the Potential of Negeri Atas Angin geosite.

1. Location Determination
Negeri Atas Angin is located in Deling Village, Sekar District, Bojonegoro City, Central Java Province, Indonesia.
2. **The Methodology**

   Our methodology that we use are literature study, field observation compared with laboratory analysis for petrography, structure geology and micropaleontology.

3. **Literature Study**

   Consist of literature review related to the research based on textbooks.

4. **Field Observation**

   To understand the general geology of the research area, and sampling the limestone and tuffan sandstone.

5. **Analysis**

   Is done by Petrography, Geology structure and Micropaleontology analysis.

6. **Geoheritage establishment**

   Is an early concept of Geoheritage establishment for this area to preserve the Geological unique object.

3. **Geology Condition**

   **3.1. Stratigraphy**

   Negeri Atas Angin composed by two different lithologies, Limestone and Tuffan sandstone (Figure 4). Negeri Atas Angin is in the Upper Angle of Kalibeng Formation, with strike dip N155°E / 30°. In the research area is composed by several formations. The bottom is the Kerek Formation, the formation above Kerek Formation is the Kalibeng Formation, and above it is the Location of the Negeri Atas Angin which includes the Upper Angle of Kalibeng Formation. Then the youngest formation is the Klitik Formation. The picture can be seen in figure 3.

   **3.2. Structure Geology**

   Based on Research Negeri Atas Angin area, evolve Anticline structure that direct northwest-southeast which form Anticlinorium (Kendeng Zone) and cut by strike slip left fault that direct northeast-southwest

   **3.3. Data**

   From the results of micropaleontology analysis contained in the limestone on Member of the Upper Angle Kalibeng Formation, obtained foraminifera plankton in the form of *Globigerinoides ruber, Globigerina venezuelana, Globorotalia pseudomiocenica, Orbulina universa, Globigerinoides trilobus* which concluded that the Member of the Upper Angle Kalibeng Formation has the age range Miocene End - Pliocene Early (N16-N19) (Blow, 1969) can be seen in Table Figure 6.

   Evidence of a middle neritic environment of a bentonic foraminifera showing the existence of that environment. The results of the bentonic foraminifera analysis contained within the limestone, showing several types of neritik middle foraminifera include: *Elphidium macellum, Notorotalia clathrata, Streblus beccarii, Tubinella inoenata* (Backer, 1960) can be seen in Table Figure 6.

4. **Discussion**

   From the results of our analysis, Negeri Atas Angin has several reasons become Geoheritage and geotourism object. First, Because in the Negeri Atas Angin has two different lithologies namely limestone, the Petrography limestones that show the presence of Lime mud (Lmd), Skeletal (Sktl), Interklas (Itkl) and Calcite (Klst) (Figure 7) and tuffan sandstone, the Petrography of tuffan sandstone showing the presence of quartz mineral (Qtz), Plagioclase (Plgs), Piroksen (Px) Ferro-Hornblende (FeHb), Opak Minerals (Mopk, and Fine Dust (Dbhs). (Figure 8)

   Second, Negeri Atas Angin is such as a beautiful place that can be used not only as an ordinary tourism object, but it can be used as a Geological Tourism or It can be used as a Natural Geology Laboratory because it has geological aspects.
5. Conclusion
Based on our Analysis, Negeri Atas Angin has huge potential to become Geoheritage and Geoturism object because its unique and has geological aspect. Because it can be use not only for tourism object but it can be use as a natural geology laboratory, its different with Geosites in National Geopark of Bojonegoro and has its own characteristic.

Development of Negeri Atas Angin Geosite is needed to introduce Negeri Atas Angin on National-International tourism, Improving the economy of local community, and Strengthen the National Geopark of Bojonegoro.

The ways to develop Negeri Atas Angin are make a better promotion for people around, and improving the Management of Negeri Atas Angin tourism. Because Negeri Atas Angin has geological aspect, We must take care of it in order to enjoy, see and study about Negeri Atas Angin geotourism in the future. We hope so the government to support the development of Negeri Atas Angin geotourism.

References
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Figure 1. Location Negeri Atas Angin.

Figure 2. Fault Directions.

Figure 3. Stratigraphy around Negeri Atas Angin.
Figure 4. Contact between limestone and tuffan sandstone.

Figure 5. Layered Structure on Limestone.
Figure 6. Micropaleontology Analysis.

Figure 7. Limestone Petrography (40x) Petrografii, Batugamping Sayatan Petrografii (40x).

Figure 8. Tuffan Sandstone Petrography (40x), Petrografii Batupasir Tuffan Sayatan Petrografii (40x).