PROCEEDINGS
GEOSEA XIV AND 45TH IAGI ANNUAL CONVENTION 2016 (GIC2016)
The Trans Luxury Hotel, Bandung, October 10 – 13, 2016

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"*ASEAN Earth Resources and Geoscientist Role in AEC Era*".

10-13 October 2016, Bandung, Indonesia

IKATAN AHLI GEOLOGI INDONESIA (IAGI)

IndonesiaAssociation of Geologist

Ikatan Ahli Geologi Indonesia (IAGI)
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PREFACE

The 45th Annual Scientific Convention of the Indonesian Association of Geologists (IAGI) this year has been held in conjunction with the GEOSEA Congress XIV (abbreviated as GIC-2016). The GEOSEA is a communication forum for the geologists in Southeast Asia countries.

The main theme of the event which is the ASEAN Earth Resources and Geoscientist Role in AEC (ASEAN Economic Community) Era has made the papers submitted and presented in the event covering a wide range of variety. The main theme covering two main topics, i.e. earth resources and geoscientist development in ASEAN countries has also been represented by the papers presented in this event.

Although since several years ago, the earth resource industry situation has not been that bright, triggered by the declining of commodity prices, regulation uncertainty, and also other issues related to the local stakeholders; this GIC 2016 event has attracted significant numbers of participants including industry geologists, faculty staff from the universities, government agencies, contractor companies, and other experts. It is the IAGI's pride to present this GIC 2016 event for the benefit of geological society in both Indonesia and ASEAN countries.

The proceedings contain all papers presented in the GIC 2016, covering various topics including

1. Engineering Geology, Hydrogeology, Mitigation and Applied Geology
2. Geology and Geophysics Method and Application
3. Geotourism
4. Mineral And Energy Resources Management
5. Mineralogy, Petrology, Geochemistry
6. Sedimentology, Stratigraphy, and Petroleum Geology
7. Tectonic, Structural Geology and Geodynamic
8. Volcanology and Geothermal

They are written by experts from various geology background including industry, government institutions, and universities.

On behalf of IAGI, we would like to thank all authors, paper reviewers, editorial team, and also to all sponsors from industry and government for their contributions and involvements. Without all of them the GIC 2016 event and the publication of this proceeding will not happened.

Bandung, October 2016

Sukmandaru Prihatmoko
Chairman of IAGI (Indonesian Association of Geologists)

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Radioactive Mineral Occurrences on Submarine Alkaline Volcanic Rocks in West Tapalang, Mamuju, West Sulawesi, Indonesia.

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Abstract

Mamuju Region recently has become one of radioactive minerals prospecting area in Indonesia. High radiometric concentration of uranium and thorium in Mamuju are distributed in basaltic to intermediate rocks (foidite to andesite) of Adang Volcanic. Radioactive minerals (uranium and thorium) occurrences were detected by using gamma spectrometer (model RS-125). The field measurements of RS-125 resulted dose rate, uranium and thorium equivalent (eU and eTh) contents of rock and soil. West Tapalang Area, part of Mamuju Region dominantly composed by lava and autobrecciaphonolite rocks. There are three volcanic domes identified in the area. They are Ahu, Labuhan Rano, and Sumare domes. Ahu dome is the biggest domes and characterized by the occurrences of leucite rich lava rocks. Some of the lava around the volcanic neck were formed in pillow lava structure shape. The other domes were composed by autobreccia rocks. Meanwhile, sedimentary rocks (limestones) were distributed in the southern part of the area and some of them were silicified. Based on measurements result, lava and autobreccia phonolite rocks as product of sub marine volcanic are the most radioactive rocks in these area.
Keywords: submarine volcanic, radioactive minerals, alkaline rocks, West Tapalang

Introduction

Mamujuis the capital city of West SulawesiProvince, has high radiation dose rate due to its Naturally Occurring Radioactive Material (NORM), has been identified in the area of Adang Volcanic formation (Syeful et al. 2014). The formation of Adang volcanic composed by feldsphatoid lava rock, pyroclastic, tuffities, and granite (Sukadana, et al. 2015). Usualy volcanic products are representative of orogenic magmas emplaced in a subduction context, with metasomatized mantle sources conforming to those of converging continental margin basalts(Conte et al. 2016). Parental magmas having small differences in major element compositions and common orogenic signatures (a spectrum of basalts straddling the subalkaline–alkaline boundary), differentiation pro- cesses gave rise to distinct evolved rocks characterized by diverse phases relationship and relative proportions which, in turn, prouced different trace element distribution patterns in the more evolved rocks (Cadoux et al. 2005). Volcanic edifice, the morphology, characteristics and petrochemical composition of volcanic outcrops recognized in the submarine portions allowed to enlarge the knowledge on the development of the volcanic activity in the area. The submarine flanks of volcano are largely dominated (i.e.80% of its areal) by erosive-depositional and mass-wasting features, ranging at different scale (Romagnoli et al. 2013). West T apalang has feature of volcanic dome in some different area, and indicating the sub-marine volcanic products. Distribution of high radiation in this area are controled by volcanic rocks distributions(Indrastomo et al. 2016). Field survey, and laboratory analysis of some sample from West tapalang was cnducted to identified the source of high radioactivity.

Data and Method

Analysis of landsat conducted to recognaized the shape of volcano arround West Tapalang. Data collection condusting by field measurements using RS-125 resulted dose rate, uranium and thorium equivalent (eU and eTh) contents of rock and soil. Laboratpry analysis conducted by petrographic and geochemistry analysis. The radiation dose rate in this area is ranging from 138 – 4,982 nSv/h, while composition of eU and eTh are ranging from 0 – 556 ppm, 25 – 586 ppm respectively. The distributions of high radiometric values are controlled by the distribution of volcanic rocks in this area. In several places the volcanics rocks was covered by Miocene limestone.

Result and Discussion

Geologically rocks are dominated type of basaltic-andesitic, basaltic-trachyandesite, phonolite, trachiandesite, phonolite, phonotephrite, tephriponolite, andecite, until trachyte-trachiandesite. In addition, the separation between the rocks that are shosonitic with rocks that are high-K Calc Alkaline to know the evolution of volcanic rocks in West Tapalang area. Adang volcanic rock is the result of a complex process of volcanic volcanism which has a volcanic center and several lava domes. These volcanic rocks are composed of ponolite to dacite rock, with ultra-potassic affinity, formed in active continental margin (ACM) (Sukadana et al. 2015). The andesites reported in this study represent the large crystal of leucite minerals. From the petrographic point of view they are not homogeneous andMamuju volcanic rocks in the area formed by repeated process of magmatism and the radioactive mineral occurrences in the area affected by the distribution of ultrapotassic rocks, the occurrence of hydrothermal processes and occurrences geological structure. The variation of rocks afinity showed that volcanic rocks in this area has multiple stage of diferensiation from parental magma. The petrographic-

geochemical characterization of submarine rockssampled in the area surrounding the West Tapalang area constraints on the Miocene age, distribution and composition of volnanic edifice showed the volcanic in West Tapalang formed as the sub-marine volcanic rocks.

Table 1. Geochemistry analysis

Symbol	MJU 4	MJU 27	MJU 38A	MJU 51	MJU 331
Komp.	Tplg	Tplg	Tplg	Tplg	Tplg
Satuan	(Wt. %)	(Wt. %)	(Wt. %)	(Wt. %)	(Wt. %)
SiO_2	51.56	52.62	52.43	51.28	51.49
TiO_2	2.565	2.483	1.112	2.039	1.426
Al_2O_3	12.4	12.78	23.33	16.86	12.74
Fe_2O_3	12.87	15.58	8.885	15.23	10.66
MnO	0.117	0.1874	0.1087	0.2974	0.2397
MgO	11.35	3.147	1.97	4.49	3.519
CaO	4.499	2.799	3.705	0.5494	7.429
Na_2O	4.11	6.26	6.99	3.76	2.323
K_2O	0.539	2.906	1.777	3.746	8.713
P_2O_5	1.144	0.165	0.5585	0.379	1.333
TOTAL	101.15	98.93	100.87	98.63	99.87
Satuan	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
V	445.4	303.5	71.4	53.8	240.9
Cr	< 1.0	< 1.0	< 1.0	< 1.0	101.3
Co	87	115	24	86	46
Ni	< 4.2	< 0.5	14.6	< 0.5	34.1
Cu	269.1	45.9	126.6	210.1	136.6
Zn	180.8	126.6	109.7	296.2	116
Ga	11.3	27.7	21	27.8	7.7
Rb	362	770.3	5287	772.5	579.1
Sr	946.1	844	812.4	356.1	1512
Y	86.6	146.9	193.9	150.2	65.1
Zr	1823	3325	834.3	2465	899.5
Nb	108.3	210.5	50.9	199.7	65.5
Ba	6591	6608	8891	30590	4525
La	362.5	399.6	382.4	339.6	276.1
Ce	706.9	774.9	378.9	547.4	510.1
Nd	98.8	124.2	148.9	< 5.1	200.5
Sm	66	83.9	71.3	41.2	41.6
Pb	364.1	234.2	190.6	380.8	162.6
Th	330.5	482.9	214.8	360.1	161.3
U	745.8	38.7	37.2	63.5	51.3

Figure 1: The appearance of volcanic rocks volcanic complex products Tapalang, (a) Lava Basalt in the village Ahu, (b) Lava pillows on a small riverin the village of Oro Stone, (c) Lava pillows Orobatu truncatedin the village, (d) Lavaalteration

Conclusions

West Tapalang has unique geological setting and variation of volcanics rocks. The circular shape of morphology, ash content and distribution of volcanic edifice showed the volcanic rocks are product of sub marine volcanic with alkaline afinity. The radioactive content of volcanics rocks are affected from magma differentiation.

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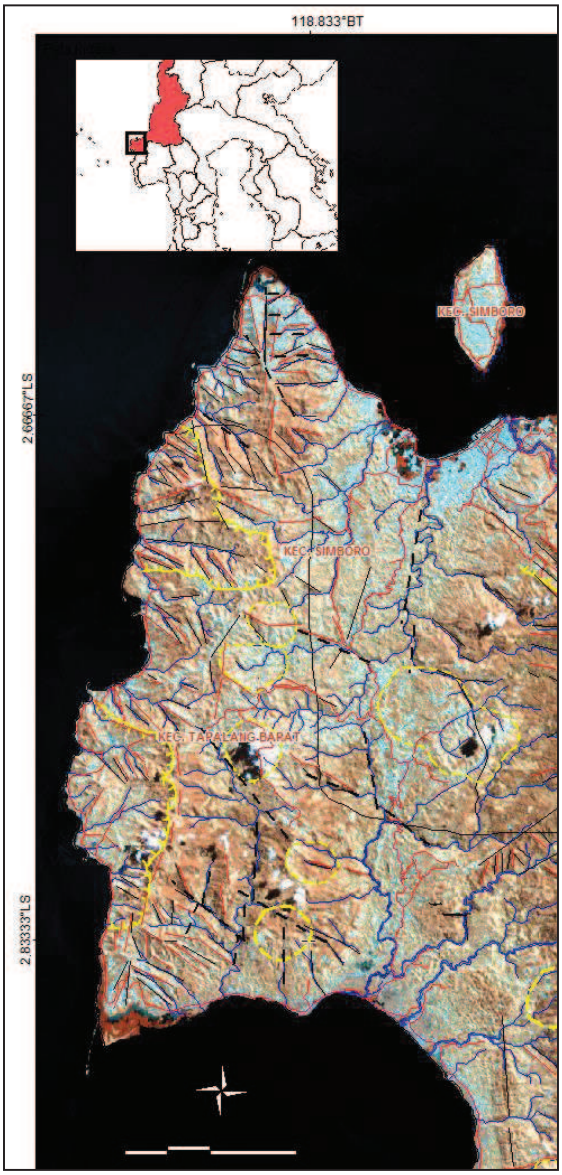

Figure 2: Morphology, leneament and volcanic creater in West Tapalang, Mamuju.