International Civil Aviation Organization

INFORMATION PAPER

Eleventh Meeting of the Meteorological Services Working Group (MET/S WG/11)

Virtual meeting, 24 to 26 March 2021

Agenda Item 2: Review of follow-up from previous meetings

PROPOSED ANP UPDATE – STATE VOLCANO OBSERVATORIES

(Presented by New Zealand)

SUMMARY

This paper presents an update on the activities of the ad-hoc group tasked with identifying APAC States with active or potentially active volcanoes which do not have a designated State volcano observatory.

1. INTRODUCTION

1.1 Section 3.6, Chapter 3, Amendment 79 to Annex 3 states that "*Contracting States with active or potentially active volcanoes shall arrange that State volcano observatories monitor these volcanoes…*".

1.2 At the Conjoint 18th Meeting of the Meteorological Information Exchange Working Group and the 10th Meeting of the Meteorological Services Working Group, following the presentation of a paper highlighting the absence of designated State Volcano Observatories (SVOs) in some Asia-Pacific (APAC) States that have active or potentially active volcanoes, the following action was agreed:

> **ANP updates – State Volcano Observatories:** Designate an ad-hoc group consisting of the Secretariat and members from the VAACs and RODBs to identify the APAC States with active or potential active volcanoes, which do not have a designated State volcano observatory listed in the APAC ANP, Vol I, Table MET I-1; conduct the necessary coordination to facilitate the States concerned with the designation of a State volcano observatory and listing it in the APAC ANP; coordinate the action above with the development of a comprehensive proposal for amendment of the ANP to reflect APAC States' current requirements for State volcano observatories [ref: para. 4.17., 8.3. and 8.4.]

2. DISCUSSION

2.1 The work of the ad-hoc group began with a review of the Smithsonian Institution's Global Volcanism Program[1] *Holocene Volcano List*, which lists all volcanoes that have erupted globally during the Holocene period (approximately the last 10,000 years). This list was then refined to contain only volcanoes in the APAC region, then sorted by State and compared to the existing eANP Vol, Table MET I-1 which lists designated SVOs in the APAC region. The volcanoes that have been active during the Holocene period that belong to a State with no designated SVO are as outlined in Attachment A. They have been sorted into two Tables, one with recent volcanic activity and the other where further volcanological advice is required to determine if these volcanoes are "potentially active".

2.2 It should be acknowledged that Philippines and Tonga have both recently made excellent progress in their work to ensure information on volcanic activity is promulgated to the aviation industry, with Philippines recently have their air navigation deficiency for this resolved. Further, other States have national volcano observatories that actively provide information to aviation organisations. For these States, the SVO designation in the eANP is expected to be administrative in nature.

2.3 Heard Island and McDonald Islands are remote islands 1500 kilometres north of Antarctica and are an Australian external territory. It is not considered practical to set up ground based observation on such islands and so in this case satellite monitoring by the State is likely the most appropriate action, particularly given the minimal air traffic in that region.

2.4 The ad-hoc group consulted with IATA and VAAC Washington on the Tables as outlined in Attachment A. The ad-hoc group also noted that for uninhabited islands, the only risk posed by the volcano may be to overflights and so it may not be feasible for aviation to bear the cost of full ground-based volcano monitoring activities when Regular Passenger Transport (RPT) operations are uncommon. IATA was supportive of the approach where agreed volcanoes in remote areas or where minimal RPT operations exist could be monitored by satellite. VAAC Washington noted that the USGS (through the Alaska and Hawai'i Volcano Observatories) primarily provides the volcano monitoring for the Mariana Islands.

2.5 Volcanoes in China (specifically Kueishantao and the Tatun Volcanic Group), Fiji, Republic of Korea and American Samoa have not erupted in many centuries. There is no evidence in Smithsonian database to suggest these volcanoes are potentially active. Advice from expert volcanologists in those regions would be needed to understand what risk these volcanoes pose to aviation.

2.6 The meeting should note that using the Volcano Observatory Notice to Aviation (VONA) template to issue information on significant volcanic activity is expected to become a recommended practice in Amendment 81 to Annex 3. It is acknowledged that for some volcano observatories this may pose a challenge to implement. Guidance is being created to assist SVOs and users under the ICAO Meteorology Panel Working Group Meteorological Operations Group – International Airways Volcano Watch work stream work programme. This guidance is also planned to include information on a minimum level of monitoring required for active or potentially active volcanoes. Guidance to assist SVOs is also currently available on the WOVO website – while dated, it may still provide some useful information, particularly on cost recovery aspects - Guidance for State Volcano Observatories: The International Airways Volcano Watch (2009).

[1] https://volcano.si.edu/gvp_about.cfm

2.7 The ad-hoc group has also coordinated updates to the existing entries to Table MET I-1, as outlined in Attachment B, based on information provided by the Japanese Meteorological Agency, VAAC Darwin and the New Zealand SVO.

2.8 The recommendation by the ad-hoc group, as laid out in Attachments A & B have now been sent to the ICAO Secretariat for further action, as outlined in the original action text:

> "*…conduct the necessary coordination to facilitate the States concerned with the designation of a State volcano observatory and listing it in the APAC ANP; coordinate the action above with the development of a comprehensive proposal for amendment of the ANP to reflect APAC States' current requirements for State volcano observatories*"

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.

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Attachment A

APAC States with with volcanoes active during Holocene period, where no SVO is designated in the eANP.

Proposed Additional SVOs

Orange highlighting indicates significant recent eruptions that have disrupted international air navigation. Additionally, Savai'i is considered a potentially active volcano by Apia Observatory, while India currently has "TBC" in Table MET I-1 and so can be invited to updated that entry.

State	Volcano	Last eruption
Philippines	**Multiple volcanoes**	2020
Samoa	Savai'i	1911
Solomon Is	**Multiple volcanoes**	2020
Tonga	**Multiple volcanoes**	2019
USA (Mariana Islands)	**Multiple volcanoes**	2012
Vanuatu	**Multiple volcanoes**	2020
India	Barren Island	2021

Volcanoes to be remotely monitored / not necessarily requiring monitoring

State	Volcano	Last eruption	Notes
Australia	McDonald Islands	2005	Islands remote, no RPT operators transiting – suggest remote monitoring sufficient.
	Heard	2020	
China	Kueishantao	1785	Advice needed on whether these volcanoes are "active or potentially active". There is no evidence in Smithsonian database to suggest these volcanoes are potentially active and so it may not be appropriate to invite States to designate SVOs for these volcanoes.
	Tatun Volcanic Group	648	
Fiji	Taveuni	1550	
	Nabukelevu	1660	
Republic of Korea	Halla	1007	
USA (American Samoa)	Tutuila	440	
	Ofu-Olosega	1866	

Attachment B

Update to existing entries in Table MET I-1. Text in red to be added, text in strikeout to be removed.

State responsible for the provision of a volcano observatory	Name of the volcano observatory
China	Heilongjiang Wudalianchi Volcano Observatory
China	Jilin Changbai Mountain Tianchi Volcano Observatory
Japan	Fukuoka Regional Volcanic Observation and ~~Information~~ Warning Center, Japan Meteorological Agency
Japan	Kagoshima ~~Local~~ Meteorological Office, Japan Meteorological Agency
Japan	Sapporo Regional Volcanic Observation and Warning ~~Information~~ Center, Japan Meteorological Agency
Japan	Sendai Regional Volcanic Observation and Warning ~~Information~~ Center, Japan Meteorological Agency
Japan	~~Tokyo~~ Volcanic Observation and Warning ~~Information~~ Center, Japan Meteorological Agency
India	TBD
Indonesia	Centre ~~Directorate~~ of Volcanology and Geological Hazard Mitigation (~~DVGHM~~CVGHM)
New Zealand	GNS Science ~~– Wairakei Research Centre Institute of Geological and Nuclear Sciences~~
Papua New Guinea	Rabaul Volcano Observatory