The origin of a diverse suite of Late Pleistocene andesitic to dacitic lavas from the northern Cascade arc at Mt. Baker, Washington.

T.D. BAGGERMAN AND S.M. DEBARI

Western Washington University, Bellingham, Wa 98225 (troy22db@gmail.com, debari@geol.wwu.edu)

This study highlights previously unreported geochemical diversity in a spectrum of andesite through dacite lavas from Mt. Baker, WA and describes processes that are responsible for their generation. Petrographic observations, mineral chemistry, major oxide concentrations, and the largest trace and REE data set to date are provided for three Late Pleistocene and Holocene lava flows: the basaltic andesite of Sulphur Creek (SC) (52.5-55.8 wt.% SiO_2, Mg# 53-54), the high-Mg andesite of Glacier Creek (GC) (58.3-58.7 wt.% SiO_2, Mg # 59-60), and the andesite and dacite of Boulder Glacier (BG) (60.2-64.2 wt.% SiO_2, Mg # 46-53). Major oxide concentrations for SC and BG display clear trends with increasing SiO_2. GC andesites are tightly clustered compositionally with elevated MgO and Ni compared to SC and BG for a given SiO2. REE patterns are distinct for each unit, but are not correlated with differentiation. The mafic lavas of SC have relatively elevated REE abundances with the lowest La/Yb (~4.5). The GC andesites have the lowest REE abundances and the largest La/Yb (~6.7). The BG lavas have intermediate REE abundances and La/Yb (~6.4). All display reaction textures and zoning patterns suggestive of magma mixing. SC mafic lavas cannot be related to the other lavas by crystal fractionation processes, nor can it explain the compositional diversity within each unit. However, magma mixing between the mafic SC lavas with compositions similar to the dacites of BG can account for the chemical trends displayed by the SC lavas. Given that the BG dacite mixing end-member erupted at 80 ka, and was mixed with the SC lavas at 9.8 ka, the process that produced this felsic end-member has been active for at least 70 ka. At other Cascade volcanoes, crustal melting processes have been called upon to explain production of comparable silicic end members.

Sources of shelf water and nutrient fluxes in the East China Sea estimated using rare earth elements

L.-L. BAI AND J. ZHANG*

Graduate School of Science and Engineering, University of Toyama, 3190 Gofuku, Toyama, 930-8555 Japan (d0470305@ems.u-toyama.ac.jp) (*correspondence: jzhang@sci.u-toyama.ac.jp)

Blooms of the jellyfish *Stomolophus nomurai* in the East China Sea (ECS) have occurred in the past approximately every 40 years, but now are occurring more frequently, probably a result of higher supplies of nutrients. It is commonly accepted that nutrients are transported into the ECS from four sources: Kuroshio Water (KW), Changjiang River Water, and the water from the South China Sea and the Yellow Sea. To understand the relative nutrient contribution of these sources to ECS, proposes of this study is to clarify the detailed water mass structure and the mixing ratios of the various different water masses.

A T/S *Nagasaki-Maru* cruise to the ECS was conducted 9-15 July 2004. Hydro-cast observations were carried out at 40 stations and water samples were collected by NISKIN bottles for determination of dissolved oxygen (DO), salinity (S), nutrients, and rare earth elements (REEs).

Based on the salinity, potential temperature and REE distributions, five water masses were classified in the ECS: I. Changjiang Diluted Water (CDW); II/III Kuroshio Surface/ Tropical Water (KSW/KTW); IV. Kuroshio Intermediate Water (KIW); and V. CDW/Kuroshio mixed shelf water (MSW). CDW (S<33) signals extend toward 31°N-127.6°E in shallow water (<20 m). REE patterns illustrate on the high position in 100 m than at other shallower or deeper water depths at two stations (28.5°N, 126.9°E and 31°N, 127.6°E). This is possibly caused by landward Ekman transport in the surface water and the compensing seaward transport in the bottom water. In the outer shelf region (bathymetrically >100 m), REE patterns were similar at 700 m and 400 m depths at two stations (29.5°N, 128.4°E; 31.1°N, 29.0°E). It is suggested the shallower one originated from the same water mass as the deeper one, which is supported by nutrient and DO results. At the inner shelf station (32.1°N, 127.5°E), REE patterns were plotted higher at 100 m depth than that in the KSW, but are enriched with high nutrients and salinity. Together with the upwelling at the outer shelf edge, it could be justified that the nutrient-enriched KIW flows toward the inner shelf sea floor around 100 m depth. Relative contributions of CDW, KIW and KTW to the inner shelf water mass (100 m) were estimated by REEs and Ho/Y ratios: CDW: KTW: KIW – 56 %: 12 %: 32 %.