

**COMMISSION ON THE CHEMISTRY OF VOLCANIC GASES (CCVG) – IAVCEI****11<sup>TH</sup> GAS WORKSHOP, KAMCHATKA, RUSSIA****AUGUST – SEPTEMBER 2011****Web site****[http://vulcanologia.uda.cl/index\\_archivos/ccvg\\_main.htm](http://vulcanologia.uda.cl/index_archivos/ccvg_main.htm)****FIRST CIRCULAR****Invitation**

On behalf of the hosting geochemical community from the Institute of Volcanology and Seismology and Russian Academy of Sciences (RAS) we are happy to invite the international geochemical scientific group working on volcanic gases to participate in the 2011 Gas Field Workshop to be held in Kamchatka, Russia, in August-September 2011.

The main topics of the workshop are the intercomparison of results of the simultaneous geochemical sampling, remote sensing methods and discussions of the current theories and observations related to volcano degassing.

**Scientific Programme**

The program will include a short scientific meeting focused on geochemistry of volcanic gases and fluxes of magmatic volatiles through volcanoes. The main topics will be:



### **Conference**

1. New techniques, including direct sampling, "multigas" and automation approaches, remote field spectroscopy, satellite imaging for measurement of volcanic gas and aerosol composition, measurements of fluxes in fumaroles, diffuse emissions and plumes.
2. Modeling frameworks for interpretation of volcanic (magmatic) and hydrothermal fluid geochemistry
3. The effect of volcanic plumes on atmospheric chemistry; hazards and environmental and human health impacts of volcanic degassing.
4. Modelling approaches related to plume-atmosphere interaction.

### **Field**

1. Direct sampling of fluids emitted from fumaroles (Mutnovsky and/or Avachinsky volcanoes),
2. Measurements of soil degassing (slopes of Mutnovsky volcano, Mutnovsky geothermal field, Karymsky caldera)
3. Plume measurements (Mutnovsky volcano, Karymsky volcano, and optional – Klyuchevskoy group of volcanoes)

### **General Information**

Kamchatka is a large peninsula belonging to the Eastern Siberia. It is located 9 time zones to the east of Moscow, between Chukotka and Kuril Islands. Its population is about 250,000 inhabitants; its capital is Petropavlovsk-Kamchatsky (~53°N) where more than 90% of population live. The Petropavlovsk Bay discovered by Vitus Bering in 1740 is one of the largest and safest in the world. Two active volcanoes, Koryaksky and Avachinsky (Koryak and Avacha, 3450 and 2750 m asl, see header, photo Dmitri Melnikov) are located ~ 25 km to the north of the town. Kamchatka is a region without civil infrastructure. In that sense it is similar to Alaska or wild parts of Canada. The main mode of transport is by big trucks moving on dirt roads. Helicopters and small planes use small airports and dirt landing grounds.

28 active volcanoes (with fumarolic activity) belong to the Eastern Volcanic Belt (EVB) which is the volcanic front of the modern subduction zone, a ~700 km-long part of the North-West Pacific chain of volcanic arcs from Aleutians, through Kamchatka, Kuril Islands, Japan, etc. The northern part of EVB, the Klyuchevskoy group of volcanoes, is one of the most active and productive in the world with large eruptions nearly twice per year of



these giant volcanoes: basaltic Klyuchevskoy (4750 m asl), andesitic Bezymianny (2900 m asl) and Shiveluch (3300 m asl). Note that Shiveluch (1964) and Mt. St. Helens (1980) eruptions could be called Bezymianny type eruptions (1956, dome explosion, sector collapse, and  $> 1 \text{ km}^3$  of pyroclastics). Farther to the south there is a group of volcanoes with fumarolic fields (Kizimen, Komarov, Gamchen). Among them, Kizimen volcano emits high-temperature gas ( $> 250^\circ\text{C}$ ) with sometimes a large and high plume. The Big Semyachik group of volcanoes is located to the south of dormant Kronotsky and Krasheninnikov volcanoes. This group is characterized by large fumarolic fields with boiling-point-temperature vapour vents and numerous hot springs. Located within this group are two famous Kamchatkan touristic destinations, the Geyser Valley and Uzon caldera. Malyi Semyachik volcano is known because of the acidic turquoise lake in its crater. One of the IAVCEI Crater lake workshops was held here in 1995. Its southern neighbour Karymsky volcano is one of the most active in the world with a specific permanent eruptive activity. It could be called "Karymsky type", because it is difficult to find another example in the world. Maybe Sakuradzima? It is like Stromboli, but not basaltic, and instead of lava blocks it erupts blasts of ash and bombs of dacitic composition with a more or less constant frequency. Zhupanovsky volcano ( $\sim 2900 \text{ m asl}$ ), 50 km to the south, emits gases from the summit fumaroles. In 1975 their temperature was  $> 400^\circ\text{C}$ . Farther south two "home" volcanoes, Koryak and Avacha (see header), both have fumarolic fields with variable outflow rates and temperatures. During the last unrest of the Koryak in 2008-2009, the apparent  $\text{SO}_2$  flux was estimated at up to 1000 t/day. Temperatures of the summit fumaroles of Avacha in 1994 were  $100\text{-}470^\circ\text{C}$  and the maximum temperature of Koryak fumaroles in 1983 was  $215^\circ\text{C}$ .



*Karymsky volcano. Photo Sergey Chirkov*

Two active volcanoes of the Southern Kamchatka can be seen from Petropavlovsk: Gorelyi ( $\sim 1900 \text{ m asl}$ ) and Mutnovsky ( $\sim 2300 \text{ m asl}$ ). They are 15 km from each other and about 60 km to the south of town. In the vicinity a geothermal power plant is now in operation ( $\sim 60 \text{ MW}$ ). Further to the south up to the southernmost Lopatka cape there are



several active volcanoes and hydrothermal systems including a famous Ksudach caldera (1907 catastrophic eruption), volcanoes Zheltovsky, Khodutka, Ilyinsky, Dikii Greben, Kambalny and Koshelev.

Mutnovsky and Karymsky volcanoes are our choice for the field activity. In late August, early September, Mutnovsky volcano is accessible using a big truck "Ural" that can move upon "tundra" of the Gorelyi caldera and approach Mutnovsky, with 40-50 min left for hiking to the crater. This stop is also an ideal site for the remote-sensing measurements of the Mutnovsky plume (100-200 t/d of SO<sub>2</sub> in 1995 and 1999). Soil gas fluxes can be measured within a large area of the Mutnovsky geothermal field on the following day. We have a preliminary 10x10 km<sup>2</sup> map of CO<sub>2</sub> concentration in the soil gas (not fluxes, just concentrations) which can be used for planning the measurements. Karymsky volcano is located 125 km to the north of Petropavlovsk and it is accessible only by a helicopter. One MI-8 chopper has a capacity for ~20 person, depending on the amount and weight of the equipment. If we are 40 people, we need 2 choppers. Main activity at Karymsky is remote-sensing and soil gas measurements. There are also hot springs at the base of the volcano (~40°C, CO<sub>2</sub>-rich)



*Mutnovsky, mid-August. Photo Mikhail Zelensky*

More details about the chosen volcanoes and a list of references in accessible journals will be presented in the second circular.



## Logistics

Our host in Kamchatka will be the Institute of Volcanology and Seismology of the Russian Academy of Sciences (Dr. Eugeny GORDEEV, director) and a small touristic company "Vulcanolog" with a team that has experience to organize small scientific events in Kamchatka and excursions into the country (Dr. Sergey KHUBUNAYA). There is a main uncertain parameter when you work in the field in Kamchatka – the weather. We have a limited time span (10 days?). We need 1-2 days for the conference, 2-3 days for Mutnovsky and 1 clear day for the Karymsky, 2 days for transportation (Mutnovsky trip, though not so distant, will need 4-5 hours, one way). One idea is to organize a field camp somewhere near this tundra lawn shown on the photo. In that case we will need to carry sleeping bags and small tents. We will think more about it.

The "Vulcanolog" company will organize everything: hotel, meals, transportation, meeting room, coffee breaks. The cost per person is estimated about \$1000. Additionally, we have to pay for helicopter about \$3000 per hour (\$200-\$400 per person, current prices, 2010). It is planned that the registration fee ~ \$1000 will be deposited on a bank account and "helicopter + souvenir" money we have to have with us as cash. No plastic! The cash machines in Petropavlovsk usually do not work.

Many people will need the Russian visa. The Second circular will have all information about this.

There are two directions to get to Kamchatka. People from Europe certainly will fly via Moscow or Saint Petersburg. Another way to get there is from the Pacific coast: Vladivostok-Petropavlovsk. To Vladivostok it is possible to come from Seoul or Beijing. Second circular will also have important information about the Russian custom rules.



### **Local Organizing Committee**

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### **Important Dates**

Second circular November 2011

Abstract dead-line & Early registration February 2011

Workshop August-September 2011

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