We report the results of direct measurements of gas emission rates in high-temperature fumaroles (100-900°C) of Kudriavy volcano, Kuriles, Russia. Pitot tube and differential manometer had been used to measure the rates and discharges of fumarolic gases in 1993-1996. Such a device allows measurements of gas rates from about tenth of centimeters per second to tenths of meters per second. Therefore, it was successfully applied for both high-discharge vigorous fumarolic gas jets and steaming fumarolic fields. The maximum measured gas rate is about 120 m/s at T=860°C, while gas velocities of the other investigated vigorous fumaroles vary in the range 8-110 m/s at temperatures 100-940°C and show positive dependence on temperature. The rates of gases from fumarolic steaming-grounds have been measured to be lower than 1 m/s in the temperature range 100-900°C. The 20-day monitoring in two fumaroles with T=340 and 720°C shows that meteoric precipitations negatively affect both gas temperature and discharge of low-T fumaroles and in a lower extent the temperature of high-T fumaroles. The temporal fluctuations of gas rate are higher and the fluctuations of temperature are lower for high-T fumaroles, when compared with the low-T ones. The decompression of high-T (900°C) and high-rate fumarolic gas jets is very fast; the gas rate of about 120 m/s drops to 100 m/s just in 10 cm above the fumarole outlet. The values of gas discharges differ by 3 orders of magnitude for different low- and high-temperature fumaroles. However, the gas discharges are quite comparable when they are recalculated for the same cross-section area (1 m²) of fumarole, im-
plying that: (a) the decrease in gas rate with decreasing temperature compensates by the increase in gas density; (b) all fumarolic fields at Kudriavy have a single isobaric magmatic source of volcanic gases. The gas emission rate from steaming fumarolic fields is evaluated to be 20,000-30,000 t/day. We suggest, however, that gases from the steaming fumarolic fields are strongly contaminated by hot air and those values cannot be directly used. The bulk gas discharge from vigorous fumaroles is estimated to be about 4,500 t/day which is 2 times more than the magmatic gas emission estimated after COSPEC measurements [1], implying a large input of a hydrothermal system.