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ACTIVE VOLCANOES OF KAMCHATKA AS SUITABLE TERRESTRIAL ANALOGS FOR FUTURE LANDING MISSIONS AND FOR CHANGE DETECTION ANALYSIS ON VENUS.

Piero D'incecco, piero.dincecco@inaf.it
INAF - Astronomical Observatory of Abruzzo, Teramo, Italy
Presenting author: **Dmitry Gorinov**, gorinov-dmitry@yandex.ruResearch Institute (IKI), Russian Academy of Sciences, Moscow, Russia
Dmitry Gorinov
Space Research Institute (IKI), Russian Academy of Sciences, Moscow, Russia, gorinov-dmitry@yandex.ru
Lev Zelenyi
Space Research Institute (IKI), Russian Academy of Sciences, Moscow, Russia, lzelenyi@iki.rssi.ru
Ludmila Zasova
Space Research Institute (IKI), Russian Academy of Sciences, Moscow, Russia, zasova@iki.rssi.ru
Oleg Korablev
Space Research Institute (IKI), Russian Academy of Sciences, Moscow, Russia, korab@iki.rssi.ru
Mikhail Ivanov
Vernadsky Institute of Geochemistry and Analytical Chemistry, Russian Academy of Sciences, Moscow, Russia, mikhail_ivanov@brown.edu
Jim Garvin
NASA Goddard Space Flight Center (GSFC), United States, james.b.garvin@nasa.gov
Giada Arney
Goddard Space Flight Center, Greenbelt, United States, giada.n.arney@nasa.gov
Stephanie Getty
NASA GSFC, Greenbelt, United States, stephanie.a.getty@nasa.gov
Justin Filiberto
NASA JSC, Houston, United States, justin.r.filiberto@nasa.gov
Erika Kohler
NASA Goddard Space Flight Center (GSFC), Greenbelt, United States, erika.kohler@nasa.gov
James Head
Brown University, Providence, United States, james_head@brown.edu
Satadru Bhattacharya
Indian Space Research Organisation, -, India, satadru@sac.isro.gov.in
Sriram Bhiravarasu
Indian Space Research Organisation, -, India, sriram.saran@gmail.com
Deepak Putrevu
Indian Space Research Organisation, -, India, dputrevu@sac.isro.gov.in

Ivan López
Universidad Rey Juan Carlos, Madrid, Spain, ivan.lopez@urjc.es
Richard Ghail
Royal Holloway London, Egham, United Kingdom, richard.ghail@rhul.ac.uk
Philippa Mason
Imperial College London, London, United Kingdom, p.j.mason@imperial.ac.uk
Ian Flynn
University of Pittsburgh, -, United States, itf2@pitt.edu
Jeremy Brossier
INAF/IAPS, Rome, Italy, jeremy.brossier@inaf.it
Carmelo Monaco
Università degli Studi di Catania, Catania, Italy, cmonaco@unict.it
Stefano Branca
INGV, Catania, Italy, stefano.branca@ingv.it
Simone Aveni
Sapienza Univeristy of Rome, -, Italy, simonesalvatore.aveni@uniroma1.it
David Trang
University of Hawaii at Manoa, Honolulu, United States, dtrang@hawaii.edu
Jake Crandall
Eastern Illinois University, Charleston, United States, jrcrandall@eiu.edu
Nicola Mari
Università di Pavia, Pavia, Italy, nmari@mtu.edu
Matthew Blackett
Coventry University, UK, Coventry, United Kingdom, aa8533@coventry.ac.uk
Goro Komatsu
Università G. d'Annunzio, Pescara, Italy, Pescara, Italy, goro.komatsu@unich.it
Nicholas Lang
NASA Headquarters, -, United States, nicholas.p.lang@nasa.gov
Bradley Thomson
University of Tennessee, Knoxville, United States, bthomso1@utk.edu
Isabella Pagano
INAF-Osservatorio Astrofisico di Catania, Catania, Italy, isabella.pagano@oact.inaf.it
Santi Cassisi
INAF - Astronomical Observatory of Abruzzo, -, Italy, santi.cassisi@inaf.it
Gabriel Eggers
Wesleyan University, -, United States, geggers@wesleyan.edu
Anastasia Kosenkova
Bauman Moscow State Technical University, -, Russia, tarasova_av@laspace.ru
Gaetano Di Achille
INAF - Astronomical Observatory of Abruzzo, Teramo, Italy, gaetano.diachille@inaf.it

The next decade will see the return to Venus due to a number of missions which have been recently selected and proposed for launch. The selected missions NASA DAVINCI and VERITAS, Roscosmos Venera-D, and ESA EnVision, along with the proposed missions ISRO Shukrayaan-1, and CNSA VOICE, will open a new era for the exploration of the Earth's hellish twin planet. These missions will shed new light on the science questions such as: (a) whether recent volcanic activity is locally constrained, or active volcanism occurs on a global scale; (b) the rate of the present-day volcanic activity; (c) the styles of volcanism on Venus, including possible occurrences of pyroclastic/explosive volcanism; and (d) how does the extreme environment on Venus effect volcanic activity. In preparation for these future missions to Venus, the Analogs

for VENus' GEologically Recent Surfaces (AVENGERS) initiative has the scope to select and analyze a number of active terrestrial volcanoes as suitable analogs for the identification and analysis of active volcanism on Venus. The Roscosmos Venera-D is the only mission, among the currently selected or planned mission, equipped with a lander to analyze the elemental and mineralogical composition of the surface. Therefore, it is crucial to find applicable volcanic areas on Earth to perform operational tests such as surface drilling and in-situ elemental composition analysis. To this regard, we propose the analysis of active volcanoes of the Kamchatka Peninsula, which is in a geodynamic setting (subduction) contrasting to that of the volcanic rises on Venus (hot spot). Thus, Kamchatka may represent a helpful geodynamic endmember to put the expected landing site of the Venera-D mission within the context of the entire variety of volcanic landforms and surface chemistry. The Kamchatka Peninsula is located on the eastern margin of the Eurasian plate, in proximity to the Kuril-Kamchatka subduction zone. The frequent eruptions characterizing the volcanoes of the Kamchatka Peninsula make them a suitable terrestrial analog for the possible detection of ongoing eruptions on Venus by future missions, which can be achieved by comparing a sequence of radar images of the same volcano and its surroundings taken at different times. Moreover, it is possible to collect samples of both unweathered and weathered volcanic deposits, to analyze their near infrared spectra in the laboratory for direct comparison with the spectra to be provided by the future missions to Venus. The chemical analyses of Venusian surface materials from the previous Soviet Venera and Vega missions are consistent with that of tholeiitic basalts. Since the volcanism of the Kamchatka Peninsula is characterized by both basaltic lava flows eruptions and pyroclastic activity, performing operational tests in the Kamchatka Peninsula also offers the unique opportunity to provide us the tools to potentially interpret the diverse output given by both effusive and explosive volcanic products.