4TH PLANET LOGISTICS

Publications on the topic lava tubes (Earth, Moon and Mars)

4th planet logistics is thankful for any contributary publication that can be added to the list, please contact admin@4thplanetlogistics.com

J. W. Ashley,; Boyd, A.K.; Hiesinger, H.; Robinson, M.S.; Tran, T.; van der Bogert, C.H.; Wagner, R.V. & the LROC Science Team, 2011. **Lunar Pits: Sublunarean Voids and the Nature of Mare Emplacement**. 42nd Lunar and Planetary Science Conference (2011).

Atkinson, A. & Atkinson, V., 1995. **Undara Volcano and its Lava Tubes.** The Authors: Brisbane, 86 pp.

Basilevsky, A., Werner, S.C.; Neukum, G.; Head, J.W.; van Gasselt, S.; Gwinner, K. & Ivanov, B.A., 2006. **Geologically recent tectonic, volcanic and fluvial activity on the eastern flank of the Olympus Mons volcano, Mars.** Geophys. Res. Lett., 33, L13201, doi:10.1029/2006GL026396.

Beinhoff, Dallas, et al, 2009. **Minimum Functionality Habitat Study**. NASA.

Boston, P.J.; Ivanov, M.V. & McKay, C.P., 1992. **On the possibility of chemosynthetic ecosystems in subsurface habitats on Mars**. Icarus 95, p. 300.

P.J. Boston, P.J.; Spilde, M.N.; Northup, D.E.; Melim, L.A.; Soroka, D.S.; Kleina, L.G.; Lavoie, K.H.; Hose, L.D.; L.M. Mallory, L.D.; Dahm, C.N.; Crossey, L.J. & Schelble, R.T., 2001. **Cave biosignature suites: microbes, minerals, and Mars**. Astrobiology 1, 25-55.

Boston, P., et al., 2004. **Extraterrestrial subsurface technology test bed: Human use and scientific value of Martian caves.** Space Technol. Appl. Int. Forum, 699, 1007–1018.

Boston, P. & S. Dubowsky, S., 2005. **Hopping microbot access to subsurface (cave) and rugged terrain on Mars and hazardous extreme Earth astrobiology sites.** Eos Trans. AGU, 86(52), Fall Meet. Suppl., Abstract P51D-0964.

Calvari, S., & H. Pinkerton, H., 1999. **Lava tube morphology on Etna and evidence for lava flow emplacement mechanisms**. J. Volcanol. Geotherm. Res., 90, 263–280.

Carr, M.H. & Greeley, R., 1980. **Volcanic Features of Hawaii: A Basis for Comparison with Mars**. SP-403. NASA, Washington, DC, 211pp.

Carr, M. H.; Greeley, R.; Blasius, K.R.; J. E. Guest, J.E. & Murray, J.B., 1977. **Some Martian volcanic features as viewed from the Viking orbiters.** J. Geophys. Res., 82, 3985– 4015.

Christensen, P., et al., 2004. **The Thermal Emission Imaging System (THEMIS) for the Mars 2001 Odyssey mission**. Space Sci. Rev., 110(1), 85– 130.

Coombs, C.R. & Hawke, B.R., 1992. **A search for intact lava tubes on the Moon: Possible lunar base habitats.** In: The Second Conference on Lunar Bases and Space Activities of the 21st Century, vol. 1.

Cruikshank, D.P. & Wood, C.A., 1972. **Lunar rilles and Hawaiian volcanic features: Possible analogues.** Moon 3, 412-447.

Cushing, G.E., Titus, T.N., Wynne, J.J. & Christensen, P.R., 2007. **THEMIS observes possible cave skylights on Mars**. Geophys. Res. Lett. 34, L17201. http:// dx.doi.org/10.1029/2007Gl030709.

Cushing, G.E. & Titus, T.N., 2009. **KILAUEA PIT CRATERS AS MARS ANALOGS: A New Direction for Cave-detection Techniques.** 40th Lunar and Planetary Science Conference.

Cushing, G.E. & Titus, T.N., 2010. **Caves on Mars: Candidate Sites for Astrobiological Exploration**. Astrobiology Science Conference 2010.

Daga, A.; Allen, C.; Battler, M.M.; Burke, J.D.; Crawford, I.D.; Léveillé, R.J.; Simon, S.B. & Tze Tan, L., 201?. **Lunar and Martian Lava Tube Exploration as Part of an Overall Scientific Survey.** A White Paper submitted to the Planetary Sciences Decadal Survey 2013-2022.

De Angelis,G.; Wilson,J.W.; Clowdsley,M.S.; Nealy,J.E.; Humes,D.H. & Clem,J.M., 2002. **Lunar lava tube radiation safety analysis**. Journal of Radiation Research 43, S41–S45.

Francis, P. 1993**. Volcanoes, a Planetary Perspective**. Clarendon Press / Oxford Univ. Press: Oxford. 443.

Frederick, R., et al., 2000. **Martian ice caves, paper presented at Concepts and Applications for Mars Exploration**. Lunar and Planet. Inst., Houston, Tex., 18– 20 July.

Greeley, R., 1971. **Observations of actively forming lava tubes and associated structures, Hawaii**. Mod. Geol., 3 ,157-160.

Greeley, R., 1972. **Additional observations of actively forming lava tubes and associated structures, Hawaii**. Mod. Geol., 3 ,157-160.

Greeley, R., 1987. **The role of lava tubes in Hawaiian volcanoes**. In: Decker, R.W., Wright, T.L., Stauffer, P.H. (Eds.), Volcanism in Hawaii: U.S. Geological Survey Professional Paper 1350, vol. 2, pp. 1589–1602 (Chapter 59).

Greeley, R.; Fagents, S.A.; Harris, R.S.; Kadel, S.D. & Williams, D.A., 1998. **Erosion by flowing lava, field evidence**. J. Geophys. Res., 103 (B11): 27,325-27,345.

Guest, J.E. & Murray, J.B., 1976. **Volcanic features of the nearside equatorial lunar maria**. J. Geol. Soc. London 132, 252-258.

Halliday, W.R., 1998. **''Pit craters'', lava tubes, and open vertical conduits in Hawaii: A problem in terminology.** Bulletin of the National Speleological Society 27B 27B (1/4), 113–124.

Halliday, W.R. & Wynne, J.J., 2008. **Differentiating lava tube skylights from pit craters; a study of the cave-like structures on Arsia Mons, Mars.** Geological Society of America Corilleran Section and Rocky Mountain Section Joint Meeting, 40, p. 33. Abstract No. 1–2.

Halliday, W.R.; Favre, G.; Stefansson, A.; Whitfield, P. & Banks, N., 2012. **Occurrence and Absence of Lava Tube Caves With Some Other Volcanic Cavities; a Consideration of Human Habitation Sites on Mars.** 43rd Lunar and Planetary Science Conference, held March 19-23, 2012 at The Woodlands, Texas. LPI Contribution No. 1659, id.1613

Halliday, W.R.; Bunell, D.; Kestay, L.; Middleton, G.; Favre, G.; Wynne, J. & Okubo, C. 2012 **Martian Lava Tube Caves and Mega-Caves Revisited.** GSA 2012 Poster.

Haruyama, J.; Hioki, J; Shirao, K.; Morota, K.M.; Hiesinger, T.; vander Bogert, C.H.; Miyamoto, H.; Iwasaki, A.; Yokota,Y.; Ohtake, M.; Matsunaga, T.; Hara, S., Nakanotani, S. & Pieters, C.M., 2009. **Possible lunar lava tube skylight observed by SELENE cameras.** Geophys. Res. Lett. 36, L21206. http://dx.doi.org/10.1029/ 2009GL0406355.

Haruyama, J.; Hara, S.; Hioki, K.; Morota, T.; Yokota, Y.; Shirao, M.; Hiesinger, H.; van der Bogert, C.H.; Miyamoto, H.; Iwasaki,bA.; Ohtake,bM.; Saito,bY.; Matsunaga,bT.; Nakanotani, S.; Pieters, C.M. & Lucey, P.G., 2010. **New discoveries of lunar holes in Mare Tranquillitatis and Mare Ingenii.** Lunar Planet. Sci. 41. Abstract 1285.

Hatheway, A.W. & Herring, A.,1970. **Bandera lava tubes of NewMexico, and lunar implications**. Communications of lunar and planetary laboratory. Universityof Arizona 8(152), 299–327.

Haramy, K.; DeMarco, M.; Meglich, T.M. & Hanna, K., 2004. **A comparison of non-invasive geophysical methods for mapping near-surface voids.** 5th Biennial Workshop Interstate Technical Group on Abandoned Underground Mines, Tuscon, AZ.

Hörz, F., 1985. **Lava tubes: Potential shelters for habitats. In: Lunar Bases and Space Activities of the 21st Century** (A86-30113 13-14). Lunar and Planetary Institute, Houston, TX, 405–412.

Howard, K.A. & Head, J.W. III, 1972. **Regional Geology of Hadley Rille in Apollo 15.** Preliminary Science Report. NASASP-289, 53–58.

Hulme, G., 1973. **Turbulent lava flows and the formation of lunar sinuous rilles**. Mod. Geol. 4, 107-117.

Kempe, S., 1997. **Lavafalls: a major factor for the enlargement of lava tubes of the Ai-la'au Shield phase, Kilauea, Hawai'i.** Proc. 12th Intern. Congress of Speleology, La Chaux-de-Fonds, Switzerland 1, 445-448.

Kempe, S. 2002**. Lavaröhren (Pyroducts) auf Hawai'i und ihre Genese**. [In] Angewandte Geowissenschaften in Darmstadt, W. Rosendahl & A. Hoppe (Eds.), Schriftenreihe der deutschen Geologischen Gesellschaft, 15, 109-127.

Kempe, S. 2008. **Immanuel Kant's remark on lava cave formation in 1803 and his possible sources**. Proc. 13th Intern. Sympos. on Vulcanospeleology, Jeju Island, Korea, 1.-5. Sept. 2008, 35-37.

Kempe, S., 2009. **Principles of pyroduct (lava tunnel) formation.** Proc. 15th Intern. Congress of Speleology, Kerrville, Texas, July 19-26, 2009, vol. 2: 669-674.

Kempe, S.; Lerch, C. & Oberwinder, M., 1999. **Channel and cave systems of the Puhia Pele Flow, Hualalai, Hawaii, and its relation to the 1801 (Huehue) Flow.** Abstract, NSS Convention 1999, Vulcanospelelogical Session; and Journal of Cave and Karst Studies, 62 (April 2000) (1), 42-43.

Kempe, S.; Al-Malabeh, A.; Frehat, M. & Henschel, H.-V., 2006. **State of lava cave research in Jordan.** Proc. 12th Intern. Symp. on Vulcanospeleology, Tepotzlán, Mexico, 2-7 July, 2006. Assoc. for Mexican Cave Studies, Bull., 19 and Socieded Mexicana de Exploraciones Subterráneas Bol., 7, 209-218.

Kempe, S., 2010. **Longitudinal section through a lava pyroduct.** Hawai'i Speleological Survey Nl., Spring 2010 #27, 18.

Kempe, S.; Bauer, I.; Bosted, P.; Coons, D. & Elhard, R., 2010. **Inflationary versus Crusted-over Roofs of Pyroducts (Lava Tunnels)**. Proceedings 14th International Symposium on Vulcanospeleology, 2010.

Lerch, C., 1999. **DGPS Kartierung von Lavakanälen des Hualalai/Hawaii, USA**. Diploma Thesis, FB 11, TU-Darmstadt, unpublished.

Léveillé, R.J. & Datta, S., 2009. **Lava tubes and basaltic caves as astrobiological targets on Earth and Mars: A review.** Planetary and Space Science, doi:10.1016/j.pss.2009.06.004.

Martellato, E., Foing, B.H. & Benkhoff, J., 2013. **Numerical modeling of impact crater formation associated with isolated lunar skylight candidates on lava tubes**. Planet. Space Sci. 86, 33–44. http://dx.doi.org/10.1016/j.pss.2013.06.010.

Mege, D., et al., 2000. **Collapse features and narrow grabens on Mars and Venus: Dike emplacement and deflation of underlying magma chamber**. Lunar Planet. Sci. Conf., XXXI, Abstract 1854.

Miyamoto, H., et al., 2005. **Mapping the structure and depth of lava tubes using ground penetrating radar**. Geophys. Res. Lett., 32, L21316, doi:10.1029/2005GL024159.

Mouginis-Mark, P., & Christensen, P., 2005. **New observations of volcanic features on Mars from the THEMIS instrument.** J. Geophys. Res., 110, E08007, doi:10.1029/2005JE002421.

Oberbeck, V.R.; Wuaide, W.L. & Greeley, R., 1969. **On the origin of lunar sinuous rilles**. Mod. Geol. 1, 75-80.

Oberbeck, V.R.; Greeley, R.; Morgan, R.B. & Lovas, M.J., 1971. **Lunar Rilles – A Catalog and Method of Classification**. Nasa TM-X62,088, 83 pp.

Ollier, C.D. & Brown, M.C., 1965. **Lava tubes of Victoria**. Bull. Volcan. 25, 215-229.

Okubo, C.H. & Martel, S. J., 1998. **Pit crater formation on Kilauea volcano, Hawaii**. J. Volcanol. Geotherm. Res. 86 (1-4), 1–18. http://dx.doi.org/10.1016/ S0377-0273(98)00070-5, ISSN 0377-0273.

Peterson, D.W. & Swanson, D.A., 1974. **Observed formation of lava tubes during 1970–71 at Kilauea volcano, Hawaii**. Stud. Speoleol. 2, 209–223.

Robinson, M.S.; Brylow, S.M.; Tschimmel, M.; Humm, D.; Lawrence, S.J.; Thomas, P.C.; Denevi, B.W.; Bowman-Cisneros, E.; Zerr, J.; Ravine, M.A. & Caplinger, M.A.; Ghaemi, F.T.; Schaffner, J.A.; Malin, M.C.; Mahanti, P.; Bartels, A.; Anderson, J.; Tran, T.N.; Eliason, E.M.; McEwen, A.S.; Turtle, E.; Jolliff, B.L. & Hiesinger, H., 2010. **Lunar Reconnaissance Orbiter Camera (LROC) instrument overview**. Space Science Review 150 (1–4), 81–124.

Robinson, M.S.; Ashley J.W.; Boyd, A.K.; Wagner, R.V.; Speyerer, E.J.; Ray Hawke, B.; Hiesinger, H.& vanderBogert, C.H., 2012. **Confirmation of sublunarean voids and thin layering in mare deposits.** Planet. Space Sci. 69. http://dx.doi.org/10.1016/ j.pss.2012.05.008.

Schulze-Makuch, D.; Irwin, L.N.; Lipps, J.H.; LeMone, D.; Dohm, J.M. & Faire´n A.G.; 2005. **Scenarios for the evolution of life on Mars.** Geophys. Res., 110, E12S23, doi:10.1029/2005JE002430.

Scott, E. D.; Wilson, L. & Head III, J.W., 2002. **Emplacement of giant radial dikes in the northern Tharsis region of Mars.** J. Geophys. Res.,107(E4), 5019, doi:10.1029/2000JE001431.

Spudis, P.D.; Swann,G.A. & Greeley,R., 1988. **The formation of Hadley Rille and implications for the geology of the Apollo 15 region.** Proceedings of the Lunar Planetary Science Conference 18, 243–254.

Wendel, J., 2017. **Lunar lava tubes could offer future Moon explorers a safe haven**. *Eos, 98.* https://doi.org/10.1029/2017EO070477

Wagner, Robert V. & Robinsson, Mark S., 2014. **Distribution, formation mechanisms, and significance of lunar pits.** Icarus 237, 52–60.

Wynne, J.J.; Titus, T.N. & Diaz, G.C., 2008. **On developing thermal cave detection techniques for earth, the moon and mars**. Earth and Planetary Science Letters 272, 1-2, 240-250; doi:10.1016/j.epsl.2008.04.037.

Wyrick, D.; Ferrill, D.A.; Morris, A.P. ; Colton, S.L. & Sims, D.W., 2004. **Distribution, morphology, and origins of martian pit crater chains.** J. Geophys. Res. 109, E06005. http://dx.doi.org/10.1029/2004JE002240.