2023 EnVision International Venus Science Workshop Programme
DLR, Berlin, Germany
Tuesday 9 May 09:00 – Thursday 11 May 17:00

When	Who	What / Title
Tuesday 9 May – morning programme		
8:00 – 09:00	**Workshop registration and coffee**	
9:00 – 09:55	**Opening session**	
	Co-chairs: Anne Grete Straume, Mitch Schulte. **Microphones:** Colin Wilson and Caroline Dumoulin	
09:00 – 09:05	Conveners	Welcome and workshop logistics
09:10 – 09:15	G. Hussain (ESA)	Welcome and ESA's planetary science missions
09:20 – 09:25	H. Rauer (DLR)	Welcome and DLR contributions to ESA planetary science missions
09:25 – 09:40	L. Colangeli (ESA)	EnVision mission adoption process
09:40 – 09:55	R. Ghail (RH University of London)	Venus science questions and how they are addressed by past, current and future missions
09:55 – 10:45	**1. Mission overview and status**	
	Co-chairs: Anne Grete Straume, Mitch Schulte **Microphones:** Colin Wilson and Caroline Dumoulin	
09:55 – 10:20	T. Voirin	EnVision Objectives and Mission Status
10:20 – 10:45	J. Lefort	EnVision science ground segment and operations planning
10:45 – 11:15	**Coffee**	
11:15 – 13:00	**2. Science payloads and experiments**	
	Co-chairs: Giulia Alemanno, Alex Akins. **Microphones:** Janus Oschlisniok and Aurélien Stolzenbach	
11:15 – 11:35	J. Helbert	The VenSpec suite on the ESA Envision mission – a holistic investigation of the coupled surface atmosphere system of Venus
11:35 – 11:50	S. Hensley	VenSAR: A Fresh Look at Venus' Surface
11:50 – 12:05	C. Dumoulin	The Radio-Science experiment onboard EnVision
12:05 – 12:20	L. Bruzzone	Subsurface Radar Sounder for the analysis of the Shallow Venus Subsurface
12:20 – 13:00	1 minute lightning talks on workshop posters	
13:00 – 14:00	**Lunch**	

When	Who	What / Title
Tuesday 9 May – afternoon programme		
14:00 – 15:45	**3. EnVision observation philosophy and strategy for Venus – part 1**	
	Co-chairs: Pascal Rosenblatt, Gabriella Gilli **Microphones:** Cedric Gillmann and Kerstin Peter	
14:00 – 14:15	L. Carter	Studying Sedimentary Processes on Venus Using Radar Polarimetry
14:15 – 14:30	T. Austin	Meteoroid Airburst Scars on Venus
14:30 – 14:45	W. Kiefer	EnVision VenSAR Stereo Topography as a Constraint on Tectonic Structure and Evolution on Venus
14:45 – 15:00	R. Ghail	On the Distribution of Seismicity on Venus
15:00 – 15:15	I. van Zelst	Estimates on the Expected Annual Seismicity of Venus
15:15 – 15:30	P. McGovern	Venus Shield Volcano Flow Apron Margins: Primary Targets for Joint Analysis of EnVision VenSAR and SRS Datasets
15:45 – 15:45	I. Lopez	Imdr Regio: The Geology of a Possible Active Hot Spot on Venus and a Target for Future Exploration by the ESA EnVision Mission
15:45 – 16:15	**Coffee**	
16:15 – 18:00	**3. EnVision observation philosophy and strategy for Venus – part 2**	
	Co-chairs: Lynn Carter, Richard Ghail **Microphones:** Walter Kiefer and Iris van Zelst	
16:15 - 16:30	S. Hensley	Looking for Change on Venus' Surface with Radar
16:30 - 16:45	P. Mason	Holistic Change Detection of Venus' Surface Features
16:45 – 17:00	P. Byrne	Assessing Rates of Volcanic and Tectonic Activity on Venus with EnVision
17:00 – 17:15	M. Pritchard	Quantifying Volcanism on Venus with VenSAR: Comparison with Earth
17:15 – 17:30	R. Herrick	The Value of a Semi-random InSAR Campaign with EnVision
17:30 – 17:45	I. Ganesh	Detecting Recent Volcanism on Venus Using VenSAR Radiometry
17:45 – 18:00	A. Le Gall	Investigating Venus' Geological History and Activity with VenSAR Radiometry
18:00 – 19:00	**Poster session**	
20:00 – 22:30	**Workshop Dinner**	

When	Who	What / Title
Wednesday 10 May – morning programme		
09:00 – 10:45	**3. EnVision observation philosophy and strategy for Venus – part 3**	
	Co-chairs: Philippa Mason, Paul Byrne **Microphones:** Trevor Austin and Robert Herrick	
09:00 – 09:15	P. Rosenblatt	On the determination of Venus' gravity field by EnVision
09:15 – 09:30	G. Gilli	EnVision Aerobraking: Unique Opportunity to Infer In-situ Density, Temperature, Waves in the Venus Upper Atmosphere
09:30 – 09:45	A. Akins	Simulated Retrievals of H_2SO_4 and SO_2 from EnVision RSE Measurements
09:45 – 10:00	K. Peter	Potential Exploration of the Venus Ionosphere with EnVision Radio Science
10:00 – 10:15	C. Gillmann	The Evolution of the Atmosphere of Venus Through Volatile Exchanges with the Interior and Escape
10:15 – 10:30	M. Way	Synergies Between Venus and Exoplanetary Observations
10:30 – 10:45	S. Kane	Venus in the Context of Exoplanet Demographics
10:45 – 11:15	**Coffee**	
11:15 – 13:00	**4. Science complementary with other Venus missions – part 1**	
	Co-chairs: Justin Erwin, Ann Carine Vandaele **Microphones:** Hiroki Karyu and Paul Byrne	
11:15 – 11:30	S. Smrekar	The VERITAS (Venus Emissivity, Radio Science, InSAR, Topography And Spectroscopy) Mission and Synergy with EnVision
11:30 – 11:45	E. Kohler	The DAVINCI Mission to Venus
11:45 – 12:00	T. Satoh	Updates on Japanese Venus Climate Orbiter, Akatsuki
12:00 – 12:15	G. Avice	Revealing the origin and evolution of the Venusian atmosphere with VATMOS-SR (Venus Atmospheric Sample Return mission)
12:15 – 12:30	C. Wilson	Observing the effects of present-day volcanism in the Venus atmosphere
12:30 – 12:45	L. Esposito	A Multiprong Approach to Identify the Unknown UV Absorber
12:45 – 13:00	S. Braunisch	A Basal Magma Ocean as a Hidden Reservoir of Noble Gases in Venus
13:00 – 14:00	**Lunch**	

When	Who	What / Title
Wednesday 10 May – afternoon programme		
14:00 – 15:45	**4. Science complementary with other Venus missions – part 2**	
	Co-chairs: Shohei Aoki, Emmanuel Marcq **Microphones:** Arnaud Mahieux and Doris Breuer	
14:00 – 14:15	N. Mueller	Synergy between VERITAS and EnVision for constraints on effusive volcanism
14:15 – 14:30	A. Davaille	Back-arc spreading and moving plates on Venus: insights from laboratory experiments
14:30 – 14:45	A. Maturilli	A Laboratory study on end-member mixing for the deconvolution of spectra measured from the Venus Emissivity Mapper
14:45 – 15:00	S. Adeli	Field campaigns to analyse spectral characterisation of various volcanic material in NIR range; preparation for EnVision and VERITAS
15:00 – 15:15	D. Nunes	Seeking Venus on Earth: The VERITAS/DLR Analog Field Campaign of 2023
15:15 – 15:30	M. Collinet	The Composition of Venus's Mantle
15:30 – 15:45	A.-C. Plesa	Thermal Evolution and Interior Dynamics of Venus: Modelling and Observations
15:45 – 16:15	**Coffee**	
16:15 – 18:00	**5. Activities in support of the EnVision mission exploration – part 1**	
	Co-chairs: Caroline Dumoulin, Robbie Herrick **Microphones:** Mitch Schulte and Anne Grete Straume	
16:15 - 16:30	T. Gerya	Ongoing mantle plume penetration through Venus lithosphere: physical mechanism and implications for EnVision
16:30 - 16:45	J. Maia	The Viscosity Structure of Venus's Mantle
16:45 – 17:00	A. Gülcher	The role of geodynamic modelling of Venus' tectonics and volcanism in paving the way for the 'Decade of Venus'
17:00 – 17:15	T. Rolf	Dynamics and Evolution of Venus' Mantle Through Time
17:15 – 17:30	O. Karagoz	Structural analyses of Latona Corona and Dali Chasma, Aphrodite Terra, Venus
17:30 – 17:45	G. Alemanno	Laboratory VNIR emissivity spectra of Venus analogue rocks for EnVision and VERITAS and the VenSpec-M/VEM verification plan
17:45 – 18:00	M.D. Dyar	Strategies for calibration and interpretation of VERITAS and EnVision emissivity spectra
19:30 – 20:30	**Public talk at the Zeiss Planetarium, Berlin, and tour**	

When	Who	What / Title
Thursday 11 May – morning		
09:00 – 10:45	**5. Activities in support of the EnVision mission exploration – part 2**	
	Co-chairs: Erika Kohler, Itziar Garate Lopez **Microphones:** Gabriella Gilli, Thomas Widemann	
09:00 – 09:15	Y. Musseau	Role of the atmosphere-interior coupling on the evolution of Venus' rotation
09:15 – 09:30	S. Port	Investigation of Calcium Minerals and SO_2 Gas Interactions under Simulated Venus conditions
09:30 – 09:45	E. Marcq	Measuring gaseous minor species in the night side troposphere of Venus with VIRTIS-H/Venus Express
09:45 – 10:00	A. Stolzenbach	3D modelling of Venus photochemistry and clouds. Support to VenSpec experiment onboard EnVision
10:00 – 10:15	M. Lefèvre	Impact of the turbulent vertical mixing on the Venus cloud chemistry
10:15 – 10:30	S. Lebonnois	The Venus Climate Database
10:30 – 10:45	T. Imamura	Mesoscale meteorology of Venus revealed by Akatsuki and expectations for EnVision
10:45 – 11:15	**Coffee**	
11:15 – 13:00	**5. Activities in support of the EnVision mission exploration – part 3**	
	Co-chairs: Tatiana Bocanegra-Bahamon, Takehiko Satoh **Microphones:** Yeon Joo Lee, Kerstin Peter	
11:15 – 11:30	S. Tellmann	Long-term Studies of the Venusian atmosphere with the Radio Science Experiment VeRa on Venus Express
11:30 – 11:45	J. Oschlisniok	Previous and future radio occultation observations of sulfuric acid and sulfur dioxide in the atmosphere of Venus
11:45 – 12:00	H. Ando	Venusian atmospheric structure revealed by Venus Express and Akatsuki radio occultation measurements
12:00 – 12:15	K. Noguchi	Vertical profiles of sulfuric acid vapor (H_2SO_4) and sulfur dioxide (SO_2) in the Venus atmosphere obtained by the Akatsuki radio occultation measurements
12:15 – 12:30	W. Shao	Spatial and temporal variabilities of clouds and chemistry on Venus and their implications for atmospheric processes
12:30 – 12:45	T. Sato	A new constraint on HCl abundance at the cloud top of Venus
12:45 – 13:00	A. Christou	Hunting for Meteors on Venus
13:00 – 14:00	**Lunch**	

When	Who	What / Title
Thursday 11 May – afternoon		
14:00 – 14:30	**6. Communicating the EnVision story**	
	Co-chairs: Thomas Widemann, Walter Kiefer **Microphones:** Anne Grete Straume, A.C. Vandaele	
14:00 – 14:15	A. Bureaud, S. Kenderdine, L. Hibberd	Venus: new perspectives towards 2031
14:15 – 14:30	F. Civet	Solar system 3D viewer for outreach in space exploration missions: application to EnVision
14:30 – 14:45	Discussion	
14:45 – 15:15	**Coffee**	
15:15 – 16:30	**7. Summaries and EnVision Red Book**	
	Co-chairs: Thomas Widemann, Walter Kiefer **Microphones:** Anne Grete Straume, A.C. Vandaele	
15:15 – 15:45	Session scribes and conveners	One-slide presentations of session highlights
15:45 – 16:30	T. Widemann, W. Kiefer	EnVision Red Book • Editorial board presentation • Plenary discussion and input
16:30 – 17:00	**8. Workshop closing session**	
16:30 – 17:00	J. Helbert, A.G. Straume, M. Schulte, T. Wiedemann, T. Bocanegra-Bahamon	Workshop closing words
17:00	**End of Workshop**	

Posters:

Session 1 (Mission overview and status):

1. Björn Grieger (ESA): ProVISION: Employing Prolog in rule-based science operations planning

Session 2 (Science payloads and experiments):

1. Lucile Conan: Characterisation of the sensitivity to bias using a gain matrix formulation for the VeSUV/VenSpec-U instrument onboard ESA's EnVision mission
2. Roderick De Cock: VenSpec-H: High-resolution IR spectrometer
3. Manuel Dominguez-Pumar: RT/ATOX-2: Miniaturized Real-Time in-situ monitoring of the degradation of materials due to ATOX etching – current development and experimentation
4. Anna Maria Gargiulio: Atmospheric Drag Effects on the Precise Orbit Determination of the EnVision Spacecraft
5. Joern Helbert: EnVision VenSpec-M - key insights into the surface and surface-atmosphere interaction and volcanic activity of Venus
6. Emmanuel Marcq: The VenSpec-U instrument on board EnVision
7. Gregor Steinbruegge: Geodetic Contributions of the VenSAR Instrument for Inferring the Interior Structure of Venus
8. Ann Carine Vandaele: The VenSpec-H instrument on board EnVision
9. Pascal Rosenblatt: Signature of Venus' atmosphere dynamics in its gravity field as seen by the EnVision radio-science experiment

Session 3 (EnVision observation philosophy and strategy for Venus):

1. Peter Grindrod: Lessons from Mapping Venus at High Resolution: Implications of Small-scale Resurfacing on Global Heat Flow
2. Grzegorz Slowik: Microorganisms as Potential Inhabitants of the Lower Cloud Layer of Venus – Lesson from the Earth's Observations of Extremophiles
3. A. Fienga: Viscosity contrasts in the Venus mantle from tidal deformations
4. I. Garate Lopez: Venus' polar clouds observed by EnVision
5. R. Mogul: Vertical Profiles for SO_2, H_2O, and HDO from the Pioneer Venus Large Probe Neutral Mass Spectrometer.
6. Márcio Martins S. Costa: VenCubSAR: a proposal conceptual mission to mapping Venus with a CubeSat SAR.

Session 4 (Science complementary with other Venus missions):

1. Michaela Walterová: Constraining the Interior Structure and Thermal History of Venus.
2. Scott Hensley: VISAR: Bringing Radar Interferometry to Venus.
3. Luciano Iess: Venus deep interior structure from VERITAS measurements of rotation and tides.
4. Erwan Mazarico: The Venus Gravity Field from VERITAS.
5. Gabriele Arnold: Studies of the Venusian mesosphere based on new mid-IR measurements from MERTIS during the two BepiColombo flybys at Venus
6. Akin Domac: Investigation of recent volcanic activities using DInSAR and NIR imaging spectroscopy on Reykjanes Peninsula, Iceland, as an analogue for Venus
7. Juniper Gillespie: In-situ Spectral Acquisition in NIR in Vulcano, southern Italy, as Analog to Venus

8. Joern Helbert: Venus facilities at the DLR Planetary Spectroscopy Laboratory (PSL) in support of the ESA EnVision, NASA VERITAS, and NASA DAVINICI missions
9. Tatsuro Iwanaka: Local time dependence of Venusian cloud top SO2 obtained from Akatsuki UV images
10. Ana-Catalina Plesa: Thermal Evolution and Magmatic History of Venus

Session 5 (Activities in support of the EnVision mission exploration):

1. Alex Akins: Revisiting Venus' Microwave Emission Spectrum: Implications for VenSAR.
2. Benjamin Taysum: Constraining the Lifetime of SO2 in the Atmosphere of Venus from a 1D Climate-chemistry Atmospheric Model.
3. Barbara De Toffoli: HECATE Project: The Evolution of Venus: Coronae, Subsurface Structure and Volcano- Tectonics.
4. Ignacio Romeo: Lithospheric and crustal thicknesses of geological provinces on Venus.
5. Max Collinet: The Basalt-Eclogite Phase Transition on Venus: Implications for Crustal Recycling and Partial Melting.
6. Jeffrey Balcerski: LEAVES – DISTRIBUTED IN SITU SENSOR PLATFORM FOR GLOBAL ATMOSPHERIC DYNAMICS.
7. Yeon Joo Lee: Long-term Plan to Monitor Venus Using Earth-orbiting CubeSats.
8. Shohei Aoki: Observations of HDO and H2O over Venus nightside by IRTF/iSHELL.
9. Ricardo Hueso: A large Network of Medium and Small-size Telescopes Supporting EnVision.
10. Hideo Sagawa: Ground-based observations of 13CO/12CO in the Venusian atmosphere.
11. Ananyo Bhattacharya: Structure of the Upper Atmosphere of Venus with Potential Applications to Upcoming Exploration Missions.
12. Hiroki Karyu: Cloud simulation by a Venus MIROC GCM: The current status and future perspectives.
13. Tobias Rolf: How Venus’ core radius uncertainty affects mantle evolution and potential present-day observables.
14. Jiacheng Tian: The Tectonics and Volcanism of Venus: New Modes Facilitated by Realistic Crustal Rheology and Intrusive Magmatism.
15. Diogo Lourenco: Influence of Possible Interior Structures on the Long-Term Evolution and Outgassing of Venus.
16. Franklin Mills: Numerical studies on polysulfur in Venus' atmosphere.
17. Flavio Petricca: Constraining the Interior Structure of Venus from the Gravitational Response to the Atmospheric Loading.
18. Tatiana Bocanegra-Bahamon: New Venus Atmospheric profiles derived from Magellan Radio Occultations.
19. Shubham Vilas Kulkarni: Effects and detectability of a possible near-surface particulate layer from EnVision/VenSpec-M observations.