

Welcome to this update from the Venus Exploration Analysis Group (VEXAG). Items for future issues, comments and suggestions welcome.

*Sanjay Limaye*  
 VEXAG Chair

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**VEXAG Steering Committee Meeting at AGU, 7 December 2011, San Francisco, CA**

*Attendees – Sanjay Limaye, Sue Smrekar, Adriana Ocampo, Sushil Atreya, Kevin Baines, Pat Beauchamp, Gordon Chin, Takeshi Imamura (JAXA/Akatsuki), Tibor Kremic, Steve Mackwell, Buck Sharpton, Dick Simpson, Håkan Svedhem (ESA/Venus Express), Laura Tennenbaum (JPL/EPO), Allen Treiman, Thomas Widemann, Tommy Thompson, Richard Eckman (NASA/SMD/ESD), Lika Guhatakurta (NASA/SMD/Helio) and also Sue Smrekar’s post-doc.*

*On the Phone: Mark Bullock, Lori Glaze, Katy Buckaroo (LPI)*

The primary objective of the meeting was to review the status of the Comparative Climatology Conference being planned in Boulder, Colorado during 25-28 June 2012. This is believed to be the first conference sponsored by all four SMD Divisions of NASA. Sanjay Limaye, Mark Bullock and representatives from Helio, PSD and ESD briefed NASA Chief Scientist and his staff on 20 December about the conference status.

VEXAG Focus Group leads also presented status reports (below) and some other pertinent topics were also discussed during the short meeting. Updates from the focus groups and other topics discussed are summarized below.

Briefly these included:

*Venus Science Nuggets – Sue Smrekar*

Sue noted that VEXAG should pursue one-page Science Nuggets for posting on the VEXAG Web-site and for NASA Headquarters. She has just generated an example that compares Mantle Plumes on Earth and Venus.

*Venus Exploration Session at COSPAR and VIRA Update – Sanjay Limaye*

Masato Nakamura and Håkan Svedhem are convening a “Exploration of Venus” session (Commission B) at COSPAR next July (13<sup>th</sup>-22<sup>nd</sup>) in Mysore, India. This is a good occasion to solicit input for the updating the Venus International Reference Atmosphere (1985), based on recent data from Venus Express. An update was previously planned almost a decade ago by Jerry Keating, but was delayed and hence this is the right moment for the update for planning future missions.

Icarus Special Issue “Advances in Venus Science” with appear in print in February 2012 and will include forty papers.

The next VEXAG telecon will be held on 17 January 2012. 11 AM – Noon Pacific / Noon – 1 PM Mountain / 1-2 PM Central / 2-3 PM Eastern.  
 JPL Meet-Me Conference Line - (818) 354-8444.

**FLASH:** At the PSS telecon on 21 December, Jim Green (PSD Director) presented the FY12 PSD budget and the appropriation language from Congress which includes: “..NASA is also directed to continue working on a detailed definition of an appropriately descope flagship mission, consistent with the findings of the most recent planetary science decadal survey”.

2. VEXAG Focus Groups Reports

Technology and Laboratory Measurements Focus Group

Tibor and Pat provided the latest status of the two activities currently being worked. A preliminary set of charts, prepared by Rodger Dyson and Natasha Johnson on capabilities of Venus simulation facilities in the US was presented. The focus will now turn to collected information on international capabilities. Takeshi Imamura noted that Japan does not have any Venus simulation facilities at this time.

A preliminary list of Venus Test Chambers in the US

Location	Volume (ft <sup>3</sup> )	Dimensions (ft by ft)	Pressure (bar)	Temperature (°C)	Species	Notes
NASA JPL	0.0009	.049 by .49	1 to 1000	20 to 1000	CO <sub>2</sub> , N <sub>2</sub> , SO <sub>2</sub>	Accelerated Weathering
MIT	0.001	0.04 by 1	1 to 200	20 to 700	CO <sub>2</sub>	Not both pressure and temperature
MIT	0.02	0.08 by 4	1 to 200	20 to 700	CO <sub>2</sub>	Not both pressure and temperature
NASA GSFC	0.13	0.41 by 1	1 to 95.6	20 to 467	CO <sub>2</sub> , N <sub>2</sub> , SO <sub>2</sub>	Materials
NASA JPL	0.45	0.33 by 5.25	1 to 103	20 to 500	CO <sub>2</sub> , N <sub>2</sub> , H <sub>2</sub> O, SO <sub>2</sub> , CO, He, Ne, Ar	RLVT, Optical Access
NASA JPL	0.5	.59 by 1.83	1 to 103	20 to 500	CO <sub>2</sub> , N <sub>2</sub> , H <sub>2</sub> O, SO <sub>2</sub> , CO, He, Ne, Ar	VMTF, Materials and Small Systems Qualification
Georgia Institute of Technology	1.05	1.16 by 1	1 to 100	20 to 343	CO <sub>2</sub> , N <sub>2</sub>	Higher altitude only
NASA Glenn	28.3	3 by 4	10 <sup>-3</sup> to 103	20 to 537	CO <sub>2</sub> , N <sub>2</sub> , SO <sub>2</sub> , Ar, H <sub>2</sub> O, CO, He, Ne, OCS, HCL, HF	Any altitude, Optical Access, Under Construction

(For additions, corrections or comments on the list below, please contact the list creators or Focus Group Leads.)

There was also discussion of the balloon-based planetary science workshop. The workshop is supporting PSD for all target areas but it has strong links to the VEXAG, which really was the catalyst for the effort. Tibor noted that Balloon Platform Workshop is shaping up and was noted in a couple PEN announcements. It will be Jan 25-26. There was a virtual Balloon Workshop with 50 or so

attendees in November. The January Workshop will be to identify what science can be achieved with a balloon born observatory for planetary science and what the driving requirements would be. The high level agenda includes an assessment of current state-of-the-art platform capabilities and emphasizes actual experience flying instruments on balloons. One output of the workshop will be a report at a Sub-Orbital Workshop in February.

VEXAG Venus Exploration Goals, Objectives, and Strategies Focus Group

There are 15 members of the group's Community Advisory Committee on revising the Goals and Objectives document. There have been two telecons held to date and more will follow. The LPSC "Special Session" on Venus (volcanism) will provide a good opportunity for discussions. It is therefore critical that the session be subscribed by the Venus community by submitting abstracts. It will be held on Friday of LPSC week. This is not a named LPSC Special Session per se. The lunch-break time-slot Venus Town-Hall meeting at LPSC will likely be of Friday, with Thursday as a back-up.

Competed Missions and SR&T Focus Group (Lori Glaze, GSFC, Lead)

The focus group discussed suggestions for changes to the text of the next ROSES call for proposals and forwarded them to NASA HQ for consideration in October. Still no word on when the draft of the next Discovery or New Frontiers AOs will be coming out. It would be a safe guess to assume that no indication of date will be available until after the 2013 budget is proposed by the President in February 2012.

International Venus Exploration Focus Group



Thomas Widemann organized the 3rd Sakura Meeting Coordinated Ground Based Measurements with VCO/Akatsuki and Venus EXPRESS 3<sup>rd</sup> Sakura meeting, ISAS, Sagamihara, Japan 21---22 Nov. 2011. The meeting enabled the Japanese Venus community to present their plans for observing and exploring Venus in the future. Dr. Imamura noted that

they are discussing a follow up mission to Venus following Akatsuki and are interested in an international dialog.

Sanjay Limaye was in India on a personal visit and took the opportunity to visit ISRO Headquarters (Bangalore), the Space Applications Center (Ahmedabad) and the ISRO Institute of Science and Technology (Thiruvananthapuram) to discuss Venus opportunities. A Venus workshop is being considered for early 2012.

### 3. Why Venus? Why Now?

Plans are under discussion for the publication of "Why Venus? Why Now? A Case for Exploration of Venus" in May 2012. This publication is intended to summarize the arguments for space exploration of Venus to seek answers to the key questions about Venus to galvanize support among the space agencies for undertaking new missions. Please contact Sanjay Limaye if you are interested in contributing. Copies are expected to be available by the Venus transit and the Comparative Climatology Conference in Boulder.

### 4. Current Missions

#### *Venus Express*

European Space Agency's Venus orbiter is continuing its Operations and no major concerns are reported. The mission is approved through December 2014 pending a review in mid 2012. ESA has made the decision to postpone aerobraking of the spacecraft to achieve a lower orbit.

The next Venus Express Science Working Team will be held in Svalbaard, Norway during 4--6 June 2012 in conjunction with the Venus transit.

#### *Akatsuki*

Akatsuki/Venus Climate Orbiter was successfully launched on 21 May 2010 by a H-IIA Launch vehicle from Japan's Tanegashima Space Center. Condition of Akatsuki spacecraft and payload instruments is normal. After determining that the main engine was not useable to orbit insertion, the project is planning to use the attitude control system thrusters to guide Akatsuki into orbit around Venus. Trajectory correction manoeuvres on November 1, 10, 21 were successful and place the spacecraft towards a Venus fly-by in 2015 presenting opportunities for orbit insertion in 2016 and beyond. Excellent support was provided by NASA/JPL DSN for tracking Akastuki in 2011. Decision on orbit insertion is pending till 2015 fly-by.

### 5. Venus Transit 5/6 June 2012

The last transit of Venus in our lifetime will occur on June 5/6 2012. It provides an excellent opportunity to engage the public in the significance of Venus and the transit. VEXAG is coordinating outreach efforts with NASA/SMD programs to facilitate coverage of global events. Please get involved and keep us informed.

## 6. Future Meetings of Interest

### Exploring the Planetary Science Achievable from a Balloon Based Observatory, January 25-26, 2012, Cleveland Ohio

A two-day workshop on Earth based stratospheric balloon platforms for extending planetary observations is being organized by Tibor Kremic ([tibor.kremic@nasa.gov](mailto:tibor.kremic@nasa.gov)) for more information.

### Lunar and Planetary Science Conference,

The 43rd Lunar and Planetary Science Conference will be held at The Woodlands Waterway Marriott Hotel and Convention Center in The Woodlands, Texas. A special session on Venus has been proposed. Interested researchers are encouraged to submit abstracts relevant to the topic of resurfacing of Venus. Look for an upcoming PEN announcement. Please contact Buck Sharpton ([buck.sharpton@alaska.edu](mailto:buck.sharpton@alaska.edu)) for more information.

A Venus Town Hall Meeting will be held either on Thursday or Friday during the lunch hour. Details to follow pending confirmation of the date/room from the organizers.

### The European Geosciences Union General Assembly, Vienna on 22-27 April 2012.

#### **Atmospheres of Terrestrial Planets (PS2.5/AS4.18)**

This session focuses on the atmospheres of terrestrial planets. With the multiple missions observing Mars, Venus and Titan, the research on planetary atmospheres is blooming with new results and advances. We welcome you to share your work with the community as contributions discussing any aspect of atmospheres of terrestrial planets and Titan. Contributions dealing with terrestrial-like extrasolar planets are also welcomed. Detailed information on the programme and meeting organization can be found on the EGU meeting website:

<http://meetingorganizer.copernicus.org/EGU2012/sessionprogramme/PS>. Abstract deadline is 17th January 2012

### Third International Planetary Dunes Workshop, 12-15 June 2012, Flagstaff, Arizona

Tim Titus has invited interested members of the Venus community to participate this two day workshop. More information at <http://www.lpi.usra.edu/meetings/dunes2012/>.

### Comparative Climatology of Terrestrial Planets, Boulder, Colorado, 25-28 June 2012

<http://www.lpi.usra.edu/meetings/climatology2012/>

### Exploration of Venus Session at COSPAR, Mysore, India, 14-22 July 2012.

Abstract deadline is 10 February 2012. Visit the conference URL for more information:

<http://www.cospar2012india.org/>

### AOGS-WPGM Joint Meeting, Singapore, 13-17 August 2012

A Session on Venus has been proposed (Takehiko Satoh, JAXA, Convener, [satoh@stp.isas.jaxa.jp](mailto:satoh@stp.isas.jaxa.jp)).

<http://www.asiaoceania.org/aogs2012/public.asp?page=home.htm>

### Solar System Exploration @ 50, Washington, DC, 25-26 October 2012

To commemorate the fiftieth anniversary of the first successful planetary mission, Mariner 2 sent to Venus, the NASA History Program Office and the Division of Space History at the National Air and Space Museum invite papers for a conference relating to the history of planetary exploration. Abstracts due 1 February 2012.

<http://history.nasa.gov/Solar%20System%20Exploration%20@%2050%20Call%20for%20Papers.pdf>



## 7. Venus in the News

Two articles published in December should be on your reading list:

**Losing Venus** by David Grinspoon – December issue of *Sky and Telescope*

**Venus Unveiled** by Nadia Drake, *Science News*, 3 December 2011 ([www.sciencenews.org](http://www.sciencenews.org))

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**Best Wishes for Holidays and a Very Happy Venus Transit Year from VEXAG**



Venus Point, Tahiti

From PUNCH, or THE LONDON CHARIVARI  
December 19, 1874

## THE TRANSIT OF VENUS

The Transit of Venus is over:  
A spot on the Sun for four hours,  
The radiant aërial-rover  
Now sparkles the chief of star-flowers,  
Home troop the astronomers various,  
And bring their celestial log,  
Some rendered by sunshine hilarious,  
Some damped by inopportune fog.  
They went forth in peaceful battalions,  
The secrets of Science to clutch,  
Americans, Germans, Italians,  
With Frenchmen and English and Dutch:  
Where the hardness of ice defies granite's  
Where lizards the noon-day warmth ahun,  
They watched the most brilliant of planets  
turn sable in crossing the Sun.

"Alma Venus," exclaimeth LUCRETIUS;  
Fair Goddess, the player of many tricks,  
Of doings fantastic, facetious,  
The quite inexhaustible genetrix!  
Now binding all nations together  
In a scheme tele-plus-spectroscopic,  
Star-goddess, you bring us fair weather,  
And we hail you as most philanthropic.  
When, braving sub-tropic malaria,  
And noses and fingers that freeze,  
From Kerguelen to dismal Siberia  
Astronomers sail o'er the seas,  
Fair Venus, our beautiful neighbour,  
Throws down her distinguishing light,  
'Twixt the armies for Science who labour,  
And the armies for conquest who fight.  
Punch with patience waits tidings of Science,  
But waits, with a thirty impatience,  
For the time when all warlike defiance  
Will cease among civilised nations.  
From quarreling canst thou not screen us,  
O brightest and clearest of stars,  
And let the last Transit of Venus  
Be crowned by the Exit of Mars?