



Cyberinfrastructure for Collaborative Volcano research and Risk Mitigation

Presentation by José L. Palma
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PASI Workshop, January 2011

Vhub.org

Collaborative Volcano Research And Risk Mitigation

Collaborating Research Groups

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Institute of Earth Sciences 'Jaume Almera' (Spain)	J. Marti
Institut de Physique du Globe de Paris	J.-C. Komorowski
Université Blaise Pascal, Clermont Ferrand (France)	T.H. Druitt
Earthquake Research Institute (Japan)	T. Koyaguchi
Instituto de Geofísica, Universidad Nacional Autónoma de México	J.L. Macias
Arizona State University (USA)	A. Clarke
Los Alamos National Laboratory (USA)	S. Dartevelle
Università degli Studi de Napoli Federico II (Italy)	C. Scarpati
Université de Genève (Switzerland)	C. Bonadonna
Universität Hamburg (Germany)	M. Hort
Barcelona Supercomputer Center (Spain)	A. Folch
U.S. Geological Survey – Cascade Volcano Observatory (USA)	L. Mastin
Smithsonian Institution (USA)	E. Cottrell, L. Siebert



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Partner Volcano Observatories

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Osservatorio Vesuviano (Italy)	A. Costa
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Montserrat Volcano Observatory	P. Cole
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Development Team

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Universität Hamburg (Ge)	
Barcelona Supercompute	
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University of South Florida	C. Connor, L. Connor, L. Courtland
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	P. Cole	Komorowski
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Barcelona Supercomputing Center		
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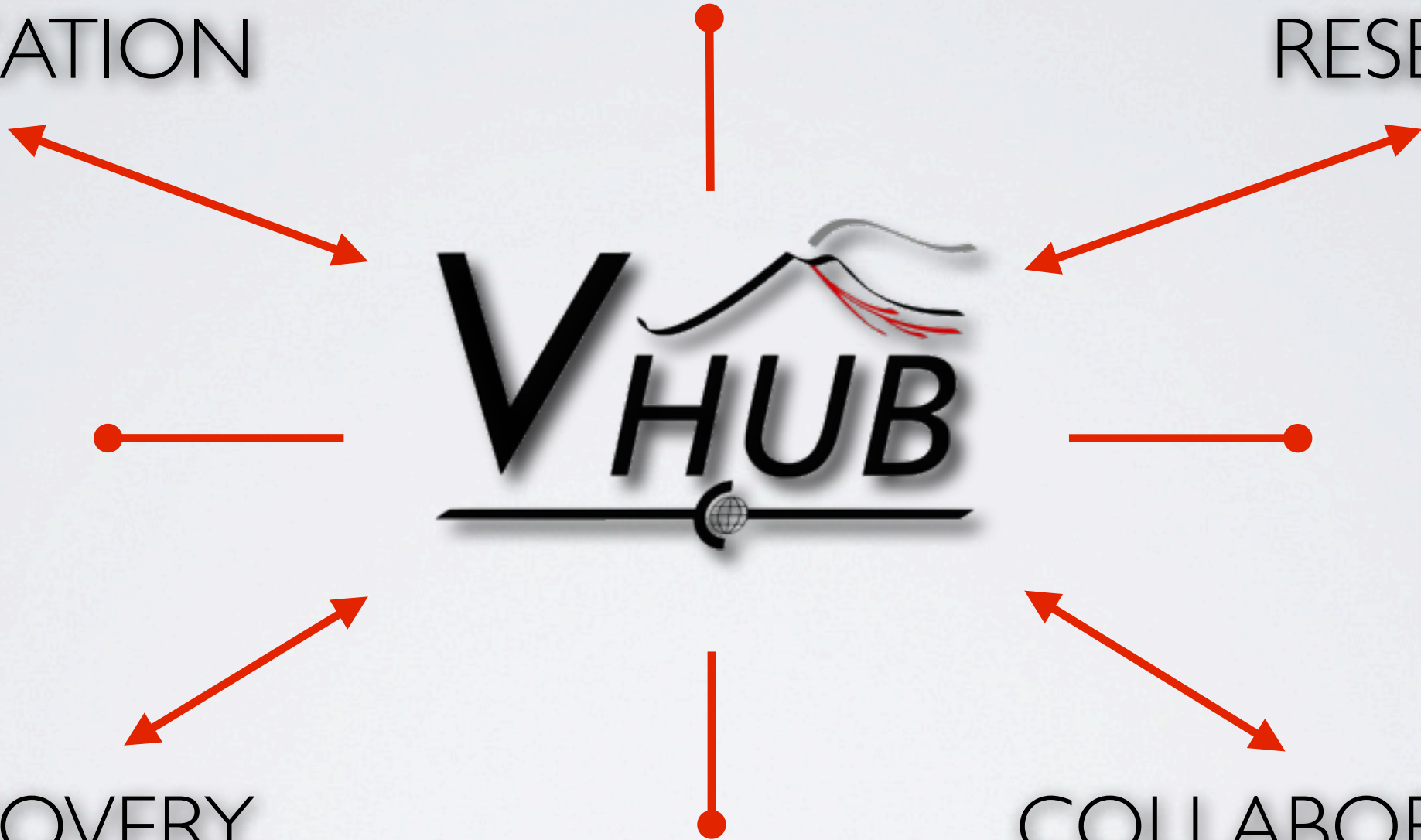
EDUCATION

RESEARCH



DISCOVERY

COLLABORATION



Volcano
Observatories

EDUCATION

RESEARCH

Faculty



Research
Students

DISCOVERY

COLLABORATION

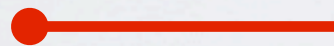
Stakeholders



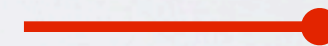


EDUCATION

RESEARCH



Lectures, Workshops,
Teaching Material



DISCOVERY

COLLABORATION





EDUCATION

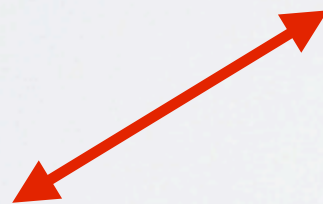
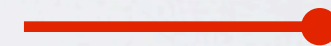
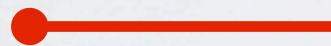
RESEARCH

Lectures, Workshops,
Teaching Material

Data and Model
Warehouse

DISCOVERY

COLLABORATION





EDUCATION

RESEARCH

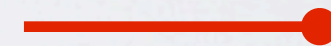
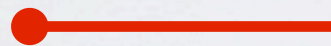
Lectures, Workshops,
Teaching Material

Groups, Topic Pages,
Q&A, Events, Blogs

Data and Model
Warehouse

DISCOVERY

COLLABORATION





EDUCATION

RESEARCH

Lectures, Workshops,
Teaching Material

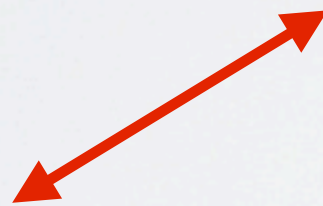
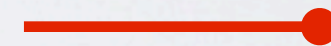
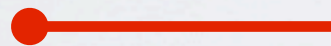
ONLINE
SIMULATIONS

Groups, Topic Pages,
Q&A, Events, Blogs

Data and Model
Warehouse

DISCOVERY

COLLABORATION



Online Simulation Tools

“The purpose of computing is insight, not numbers.”

R.W. Hamming (in the introduction to his book, *Introduction to Applied Numerical Analysis*, 1971.

“In this book Hamming taught that tailoring a numerical method to fit a physical problem, rather than blindly using a generic “all-purpose” routine, could provide insight into the problem by underlining its peculiarities.”

http://en.wikipedia.org/wiki/Richard_Hamming



R.W. Hamming

Online Simulation Tools

The screenshot shows a web browser window titled "vhub - Tools: Workspace: Session: 1191 'Workspace'". The address bar contains the URL "https://vhub.org/tools/workspace/session/1191". The page features a "Workspace" header with a "Storage (manage)" indicator showing 16% usage. Navigation tabs include "Tool", "Questions?", and "About". Action buttons for "Refresh Window", "Popout", and "Close" are visible. Two terminal windows are open: "Color xterm" and "Terminal". The "Color xterm" window shows the output of a "ls -l" command, listing files like "data", "derby.log", and "titan2d". The "Terminal" window shows a directory listing of files named "test1.ascf". A taskbar at the bottom includes a Debian logo, window management icons, and a system tray with a clock showing 13:08:05. At the bottom of the page, there is a sharing section with a text input field, a "Read-Only?" checkbox, and a "Share" button. A status message at the very bottom reads "Applet VncViewer started".

Storage (manage)
16%

Tool Questions? About Refresh Window Popout Close

```
jose@localhost:~$ ls -l
total 12
drwx----- 4 jose public 4096 Aug 23 22:42 data
-rw-r--r-- 1 jose public 349 Jan 4 11:38 derby.log
drwxr-xr-x 3 jose public 4096 Aug 9 17:39 titan2d
jose@localhost:~$ c
```

```
v Terminal Tabs Help
jose public 4096 Aug 9 17:50 2010_08_09
jose public 4096 Aug 9 17:55 2010_08_09
jose public 4096 Dec 28 16:57 2010_12_28
jose public 0 Dec 28 16:55 test1.ascf
jose public 215 Dec 28 16:55 test1.ascp
jose public 0 Dec 28 16:55 test1.ascp
jose public 546 Dec 28 16:55 test1.ascp
jose@localhost:~/test1$
```

debian [window icons] 1 2 3 4 xterm Terminal 13:08:05 790 x 346

Share session with (enter usernames separated by spaces or commas): Read-Only?
(Session is currently not shared.)
What does it mean to **share a session**?

Applet VncViewer started

Online Simulation Tools

The screenshot shows a web browser window titled "vhub - Tools: Titan2D Mass-Flow Simulation Tool: Session: 1201 'Titan2D Mass-Flow Simulation Tool'". The address bar shows the URL "https://vhub.org/tools/titan2d/session/1201". The page title is "Titan2D Mass-Flow Simulation Tool". In the top right corner, there is a "Storage (manage)" indicator showing 24% usage. Below the title bar, there are navigation tabs: "Tool", "Questions?", and "About". To the right of these tabs are "Refresh Window", "Popout", and "Close" buttons. The main content area is a form titled "Titan" with several tabs: "Load/Save", "GIS", "General", "Material Map", "Piles", "Flux Sources", "Discharge Planes", "Job Submission", and "Job Monitor". The "General" tab is active. The form contains the following fields and options:

- Number of Computational Cells Across Smallest Pile/Flux-Source ...: 20
- Scale Parameters section:
 - Scale Simulation: True, False
 - Scale Length: 20000
 - Maximum Number of Time Steps: 300000
 - Maximum Time: 1000
 - Time Between Results Output: 20
 - Time Between Saves: 90
- Adapt the Grid: True, False
- Visualizaton Output Type(s):
 - mshplotXXX.plt
 - tecplotXXX.plt
 - Web Viz
 - HDF/XDMF/Paraview
 - GMFG

At the bottom of the form, there is an "Import/Export" button and a "Titan" label. The window dimensions are 866 x 469. A status bar at the bottom left of the browser shows "Applet VncViewer started".

Online Simulation Tools

vhub - Tools: Tephra2: Session: 1226 "Tephra2"

https://vhub.org/tools/tephra2/session/1226

Storage (manage) 24%

Tephra2

Tool Questions? About Refresh Window Popout Close

1 Input → 2 Simulate About this tool Questions?

Wind File: no wind

Grid file:

Config File (optional): Irazu 1963

Plume Height (m):	8000
Eruption Mass (kg):	5.9e10
Max Grainsize (phi units):	-5.0
Min Grainsize (phi units):	5.0
Median Grainsize (phi units):	-1
STD Grainsize (phi units):	2
Vent Easting (UTM):	187500
Vent Northing (UTM):	1104550
Vent Elevation (asl):	1
Eddy Constant:	0.04
Diffusion Coefficient (m ² /s):	800
Fall Time Threshold (s):	100000
Lithic Density (kg/m ³):	1000

Simulate >

Applet VncViewer started

Live

Demonstration