The Vhub experience -- online simulations are the water coolers …

Abani K Patra,
University at Buffalo, USA

VHUB

Greg Valentine[1], **Abani K Patra[1]**, Jorge V Bajo[1], Marcus I Bursik[1], Eliza S Calder[2], Simon Carn[3], Sylvain Charbonnier[4], Chuck Connor[4], Laura Connor[4], Leah Courtland[5], Steve M Gallo[1], Peter Johnson[1], Matthew Jones[1], Jose L Palma[6], Chris Renschler[1], Bill Rose[3]

[1]University at Buffalo, USA; [2]University of Edinburgh; [3]Michigan Technological University, USA; [4]University of South Florida, USA; [5]Georgia Tech, USA; [6]University of Concepcion, Chile

VHUB

“Vhub.org is a terrific example of HUBzero. You are drawing more than 50,000 visitors every year, and you have an engaged audience of 14,000 users.”

IAVCEI’13 attracted ~1000 attendees

Journal of Applied Volcanology
a SpringerOpen Journal

Methodology

Highly accessed Open Access

Vhub: a knowledge management system to facilitate online collaborative volcano modeling and research

Jose L Palma[1,2*], **Leah Courtland**[3,5], **Sylvain Charbonnier**[3], **Riccardo Tortini**[4] and **Greg A Valentine**[2]

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Published: 14 February 2014

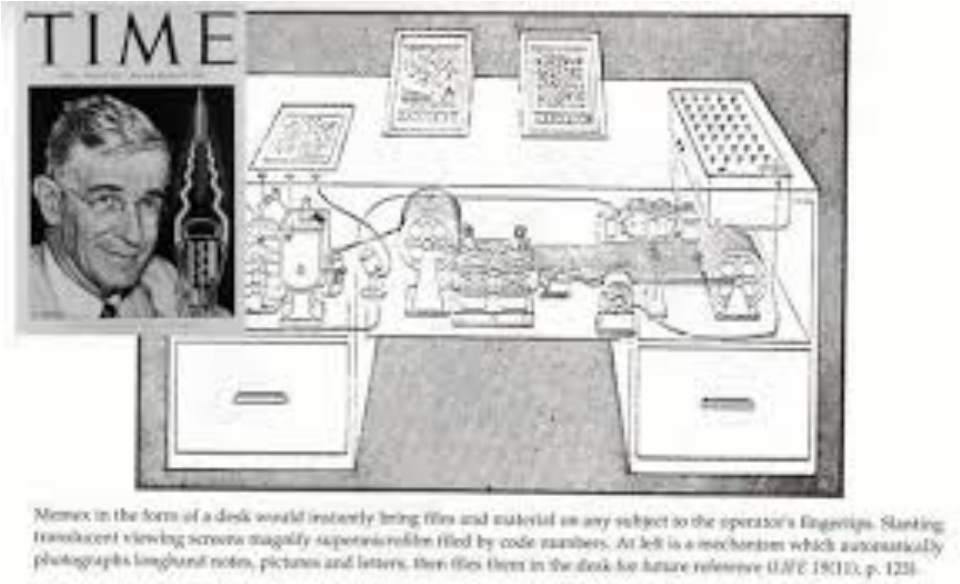
Abstract

Knowledge of volcanic systems and the hazards they produce is rapidly advancing as internet resources become more readily accessible, new and more sensitive field techniques are developed, and ever greater amounts of data are collected. Such rapid advances drive the need for an online collaborative knowledge management system that enables the sharing of volcanological information, and modeling and analysis tools. Vhub (http://vhub.org *webcite*) is a community cyberinfrastructure platform designed for collaboration in volcanology research, education, outreach, and discovery that complements existing volcano databases and other cyberinfrastructure projects. Vhub is unique in its functionality as a nucleus for the creation of collaborative groups focused on issues such as code development, field research, education, and hazard mitigation. In addition, Vhub serves as a clearinghouse and virtual platform for computational tools relating to volcanic processes and data analysis, as well as documentation to aid in the use and understanding of these tools. By providing a means for scientists to easily disseminate data, models, and ideas, Vhub aims to promote collaboration amongst scientists and to provide resources for science education while advancing the state of understanding of volcanoes and the hazards they produce. This paper introduces the Vhub cyberinfrastructure and provides an overview of select hub features and resources.

Keywords: Volcanology; Cyberinfrastructure; Knowledge management; Volcano modeling; Volcanic hazards

"*Professionally our methods of transmitting and reviewing the results of research are generations old and by now are totally inadequate for their purpose.*"

V. Bush, Jul 1, 1945 ,The Atlantic Magazine



Memex in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supersensitive microfilm filled by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference (LIFE 1945) p. 123)

VHub has created:

- an effective, **community cyberinfrastructure;**
- that allows **global data and information discovery and knowledge management;**
- enables **efficient collaboration** among **dynamic groups of geographically distributed collaborators;**
- allows **effective use of complex computer models** within and across disciplines.

VHUB

EarthCube has the potential to:

- Create effective, **community-driven cyberinfrastructure**
- Allow **global data discovery and knowledge management**
- Achieve **interoperability and data integration** within and across disciplines

VHUB

"If I have seen further it is by standing on ye sholders of Giants." I. Newton letter to R. Hooke 1676

Vhub builds on the successful Nanohub and the template Hubzero!

VHUB

Vhub.org is a site for collaborative volcano research and risk mitigation. Use the menus above to browse available simulation tools, data resources and links to all things volcanic.

Want to contribute to VHub? Follow **this link** to get started.

FIND CONTENT BY TAGS

Keyword or phrase: Search

Popular Tags:

IAVCEI Commission on Monogenetic Volcanism | Language: English | Remote Sensing | TITAN2D | tephra | Disaster Zone | Nevado del Ruiz | Eyjafjallajokull | VUELCO | workshop | More tags ›

Courses, Data Sets/Collections, Educational Materials, Miscellaneous, Offline Tools, Presentations, Publications, Tools, Workshops... All Categories ›

Upload your own content! Get started ›

WHAT'S NEW IN RESOURCES

JOB POSITIONS in GEOPHYSICS at OVSICORI-UNA Costa Rica
in Miscellaneous, Oct 24, 2013

JOB POSITIONS in GEOPHYSICS at OVSICORI-UNA Costa Rica
in Miscellaneous, Oct 24, 2013

Montserrat42_part_aa
in Data Sets/Collections, Oct 22, 2013

IAVCEI CVS Oral Abstracts
in Workshops, Oct 22, 2013

CVS Newsletter (March 1999)
in Miscellaneous, Oct 22, 2013

CVS Newsletter (Oct 1999)
in Miscellaneous, Oct 22, 2013

More new resources ›

UPCOMING EVENTS

No events to display

More events ›

Powered by HUBzero®, a Purdue project
VHub is funded by the National Science Foundation

Satellite Data for Volcano Monitoring: a Users Guide

by Simon Carn, Jose L. Palma, Peter W Webley

Introduction

The aim of this wiki is to provide a resource for volcanologists who are interested in using satellite datasets to monitor volcanic activity, and to answer questions such as: what satellite datasets are useful for routine volcano surveillance? What measurements do they provide? What types of activity can be monitored?

An increasing number of satellite datasets are becoming available at no cost over the internet, representing a useful and cost-effective means of monitoring volcanoes (e.g., fluxes of heat and gases), particularly in remote regions. Satellite data are typically provided in a variety of formats and data processing levels that can be confusing to the uninitiated. In due course this wiki will be updated with the information needed to exploit the available satellite datasets relevant to volcanology. Other VHub users can also edit the wiki page and add relevant information.

The collection of links below will take you to external websites for various satellite sensor data products, mostly focused on monitoring of volcanic clouds and plumes. To see a list of acronyms and abbreviations, check the ⇨Glossary.

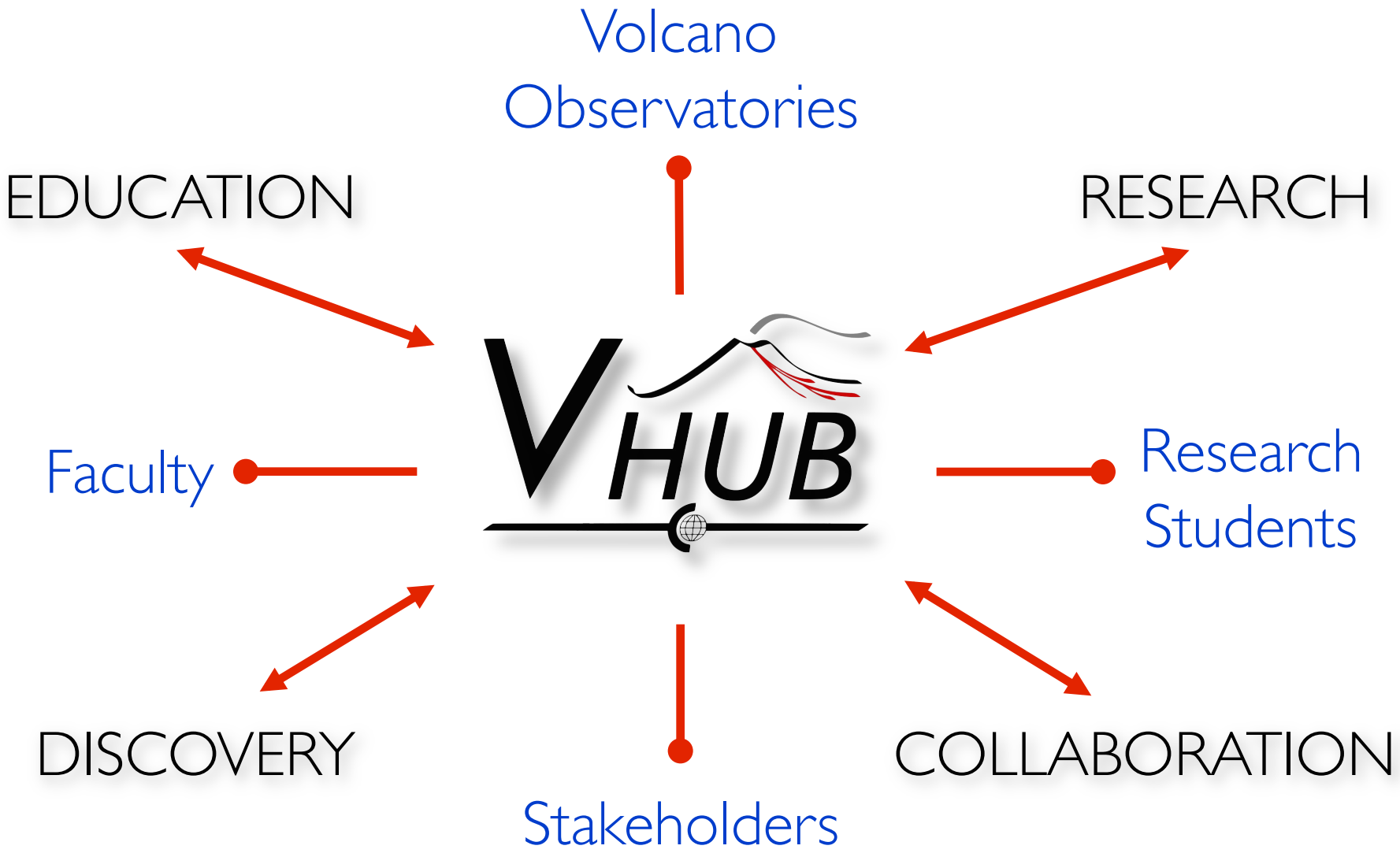
Observations of volcanic activity

The following links will direct you to already processed satellite data showing thermal anomalies, tephra dispersion, gas emissions and/or flow emplacement.

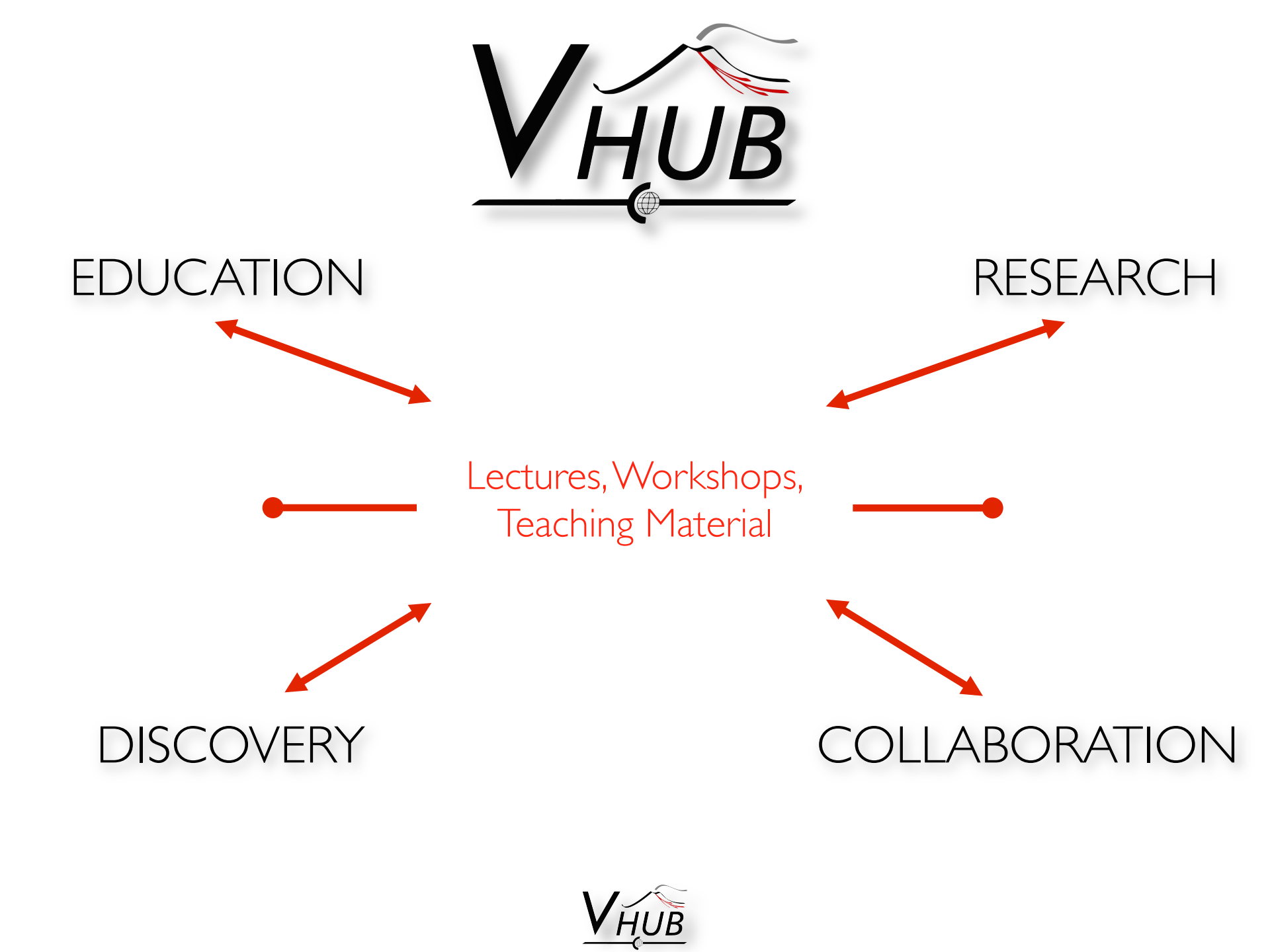
- Earth Observatory (NASA), Natural Hazards: This site provides high resolution images of recent eruptive activity acquired by MODIS and the Advanced Land Imager (⇨ALI). ⇨http://earthobservatory.nasa.gov/NaturalHazards/
- MODIS Thermal IR hotspots (MODVOLC – Univ Hawaii): ⇨http://modis.higp.hawaii.edu/
- Operational SO_2 data from OMI (NASA GSFC): ⇨http://so2.gsfc.nasa.gov

Tags

A-Train AIRS Aqua ASTER Aura AVHRR CALIPSO CloudSat GOES GOME-2 IASI MetOp MLS MODIS MTSAT OMI Remote Sensing Satellite measurements SEVIRI Sulfur Dioxide Terra volcanic ash



Currently ~2450 registered users, ~15,000 unregistered
~500 online simulation users.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vhub – Resources: AshFall: A graduate course in volcanology with substantial meteorological content

https://vhub.org/resources/411

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You are here: Home » Resource Warehouse » Courses » AshFall: A graduate course in volcanology with ... » About

AshFall: A graduate course in volcanology with substantial meteorological content

By William I Rose

Michigan Technological University

Michigan Tech's AshFall course By W
series of lectures was put together i
part of a graduate level course whic
evaluations of ashfall models, compa
with actual ashfall ...

View Course Lectures

Additional materials available (1)

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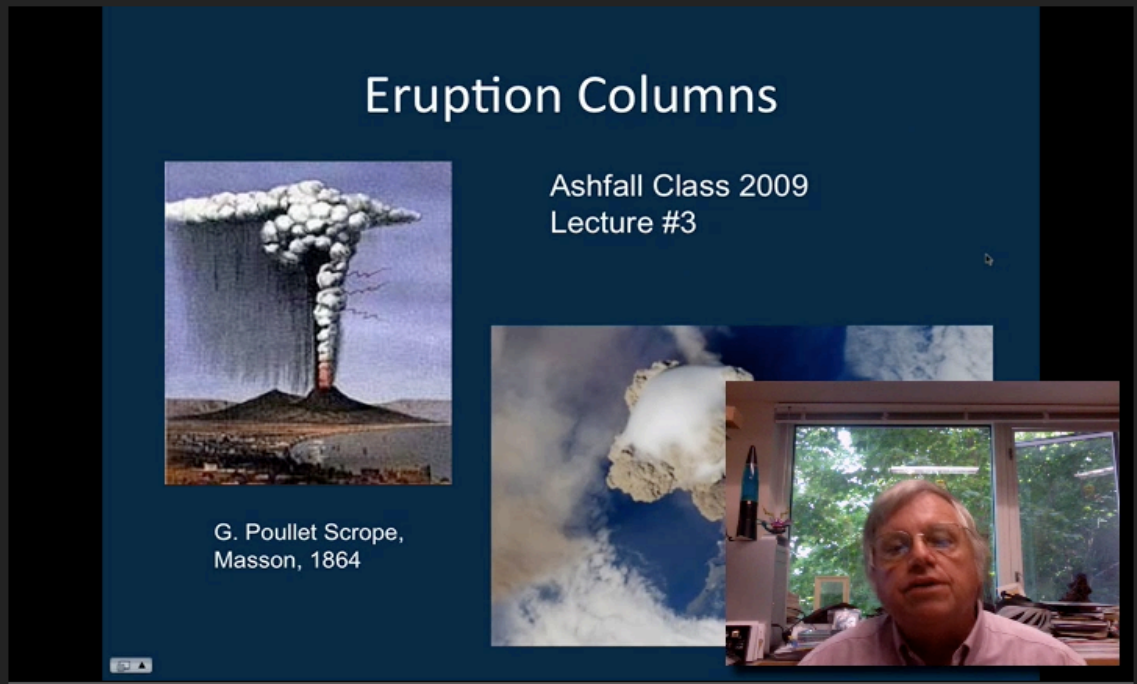
Abstract Michigan Tech's A

This series of lect
graduate level cou
models, comparin
Grain size distribu
lectures are desig
and laboratory an

Lectures

1. Origin of Ash
2. Phreatic and

https://vhub.org/resources/473/download/Ashfall3.1.mov



VHUB

Resources: Workshops

Workshops Go

Tag	Resources (Sort by Title)	Info
[All]	2010 Pasto Short Course: Andesite ...	Select a resource to see details.
andesite (1)	2012 JOINT WORKSHOP ON DISASTER RESPONSE	
ash transport (1)	Eyjafjallajökull, volcanic clouds and ...	
ashfall (1)	IAVCEI 2008 short course, Reykjavik, ...	
ASTER (1)	IUGG 2011 Workshop VW01: VHub ...	
aviation (2)	Keilir Conference Summary	
conference (1)	Large-Scale Experiments Workshop	
Cordon Caulle (1)	PASI: Volcanic Hazards and Remote ...	
Costa Rica (1)	Volcano Monitoring Workshops II : IUGG ...	
debris avalanches (1)		
Differential GPS (1)		
disaster (1)		
DOAS (1)		
eclipse (1)		
eruption columns (1)		

Top Rated

The following are top-rated resources of this type.

Keilir Conference Summary Edit

★★★★★ 0.0 out of 5 stars

29 Sep 2010 Workshops Contributor(s): Marcus I Bursik

Summary statement for the Atlantic Conference on Eyjafjallajökull and Aviation 15-16 September 2010, Keflavik Airport, Iceland. Contains links to other material. Freely available for redistribution. http://en.keilir.net/keilir/conferences/eyjafjallajokull/

Large-Scale Experiments Workshop Edit

★★★★★ 0.0 out of 5 stars

08 Oct 2010 Workshops Contributor(s): Greg A Valentine, Pierfrancesco Dellino, Costanza Bonadonna, Amanda Bachtell Clarke

This workshop aimed at developing research priorities and initial design concepts for an international user facility for large-scale experimentation on volcanic processes. Agenda .pdf Presentations Introduction by Greg Valentine .pdf .mov Integrating numerical and laboratory models of ...

PASI: Volcanic Hazards and Remote Sensing in Pacific Latin America Edit

★★★★★ 0.0 out of 5 stars

11 Jan 2011 Workshops Contributor(s): William I Rose, Jose Luis Palma

SCHOLAR COMMONS
USF UNIVERSITY OF SOUTH FLORIDA

Numeracy
Advancing Education in Quantitative Literacy

Volume 5 | Issue 2 Article 6

7-2-2012

Introducing Geoscience Students to Numerical Modeling of Volcanic Hazards: The example of Tephra2 on VHub.org

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Charles Connor
University of South Florida, cbconnor@usf.edu

Laura Connor
University of South Florida, lconnor@usf.edu

Costanza Bonadonna
University of Geneva, Costanza.Bonadonna@unige.ch

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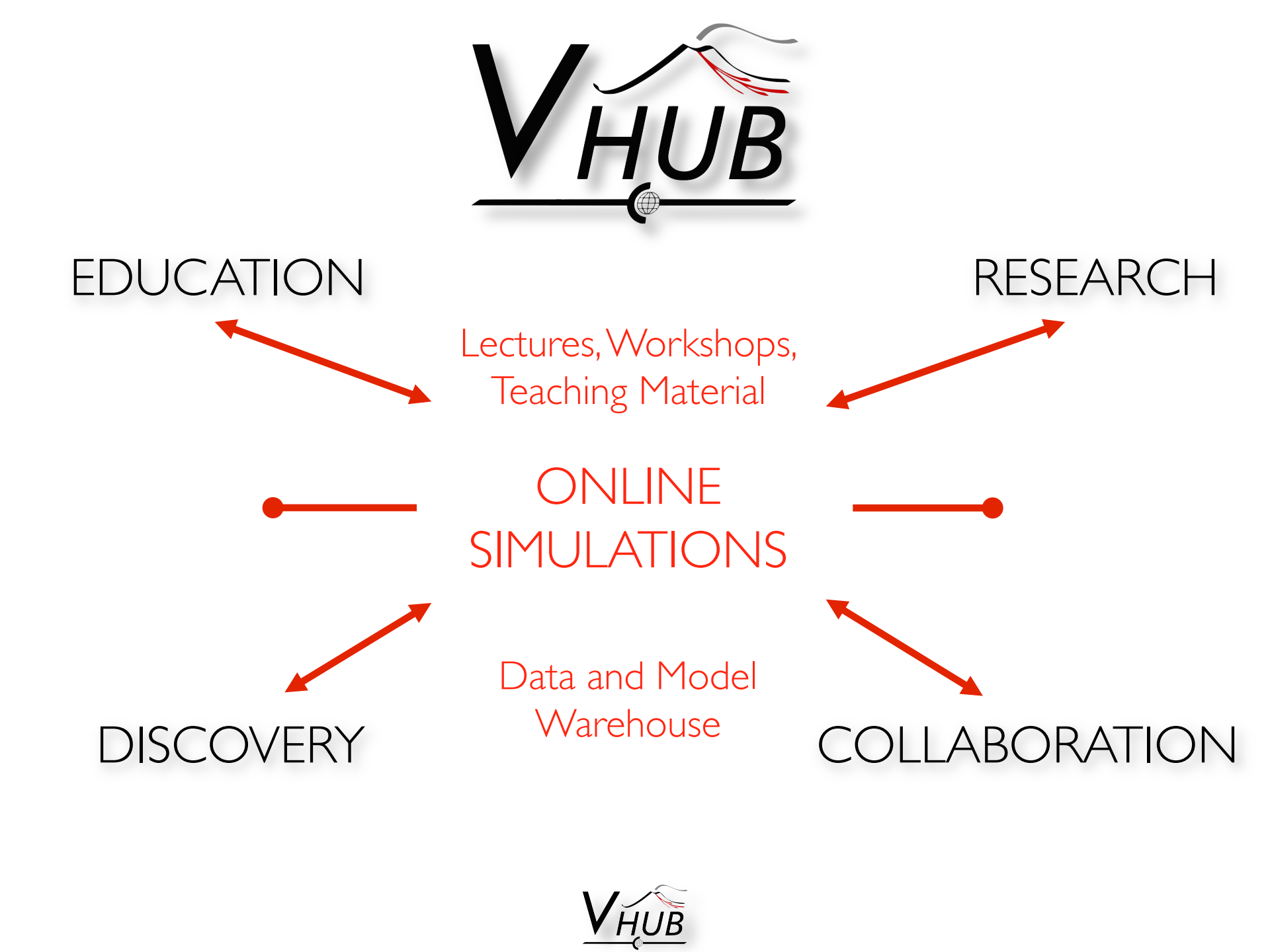
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SIMULATIONS
Data and Model
Warehouse
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Resources: Tools

Tools Go

Tag	Resources (Sort by Title)	Info
[All]	Arithmetic Demo	Select a resource to see details.
ash (1)	Bayesian Event Tree for Volcanic Hazard	
ash transport (2)	Bent - Atmospheric Plume Analysis	
Bayesian inference (1)	CFU	
cation per formula unit (1)	DEM converter for Titan2D	
Colima (1)	Hazmap	
DEM (1)	lava	
demo (1)	Petrological INput - Graphical oUtput	
Digital Elevation Model (1)	Tephra2	
education (1)	Tephra2: Student Version	
geochemistry (1)	Titan2D Mass-Flow Simulation Tool	
isopach (1)	Titan2D Viewer	
lab (1)	Workspace	
lava flow (1)		
microprobe analyses (1)		

Top Rated

The following are top-rated resources of this type.

Bent - Atmospheric Plume Analysis Edit

★★★★★ 5.0 out of 5 stars

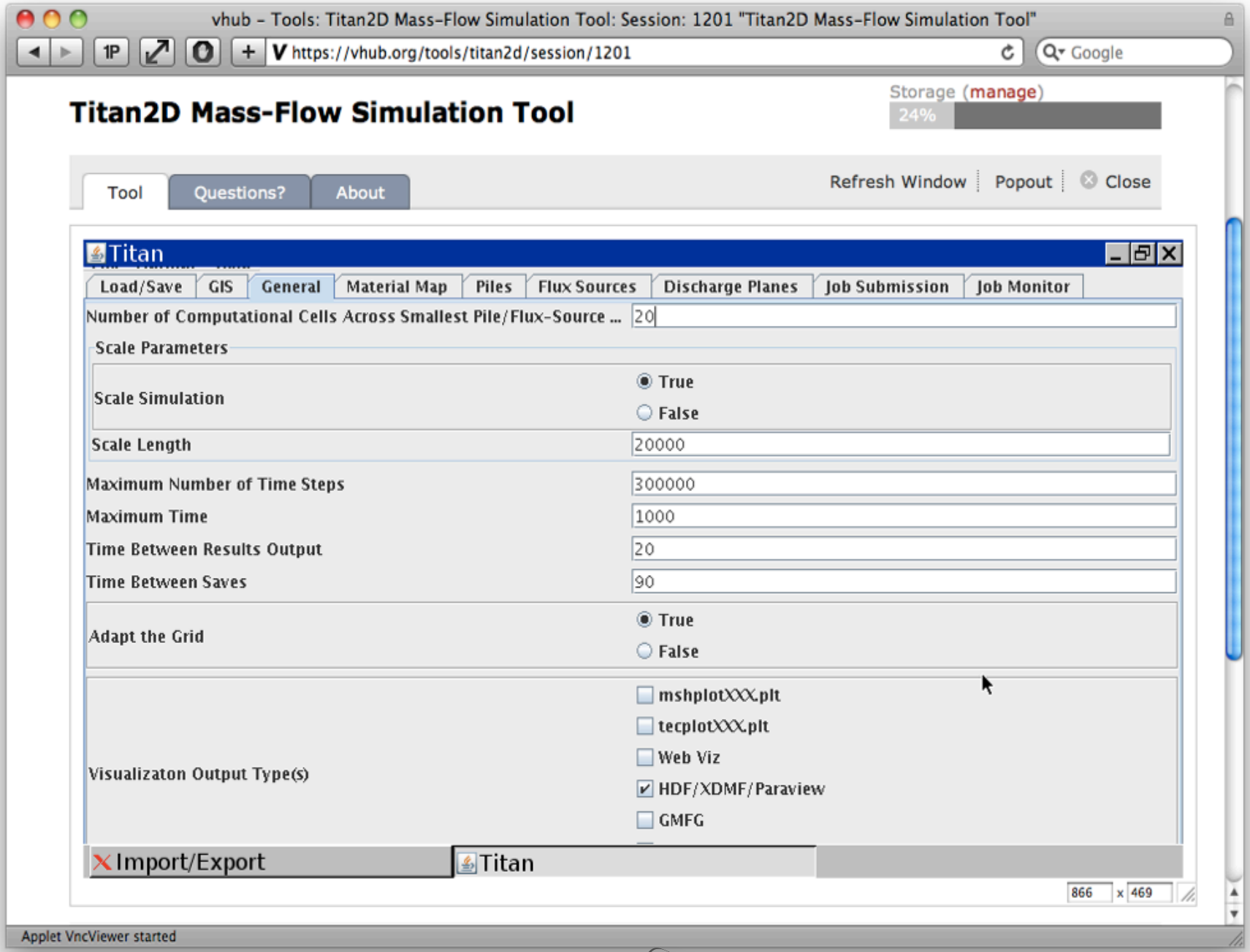
17 Mar 2010 Tools Contributor(s): Marcus I Bursik

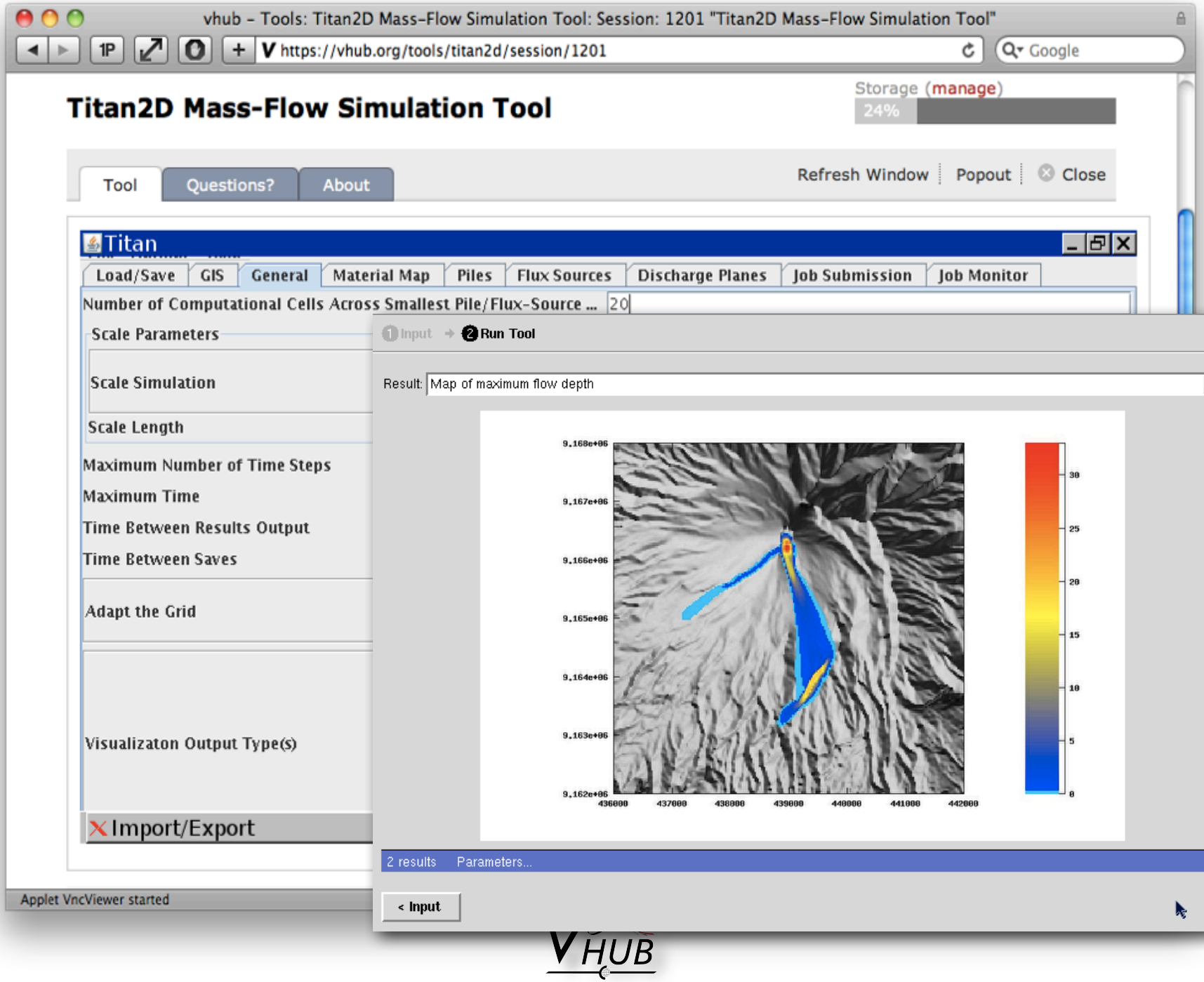
Atmospheric Plume Analysis

Titan2D Mass-Flow Simulation Tool Edit

★★★★★ 5.0 out of 5 stars

26 Apr 2010 Tools


vhub – Tools: Titan2D Mass-Flow Simulation Tool: Session: 1201 "Titan2D Mass-Flow Simulation Tool"
https://vhub.org/tools/titan2d/session/1201
Google
Titan2D Mass-Flow Simulation Tool
Storage (manage)
24%
Tool
Questions?
About
Refresh Window
Popout
Close
Titan
Load/Save
GIS
General
Material Map
Piles
Flux Sources
Discharge Planes
Job Submission
Job Monitor
Number of Computational Cells Across Smallest Pile/Flux-Source ...
20
Scale Parameters
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
Import/Export
Titan
866
x
469
Applet VncViewer started


vhub – Tools: Titan2D Mass-Flow Simulation Tool: Session: 1201 "Titan2D Mass-Flow Simulation Tool"
https://vhub.org/tools/titan2d/session/1201
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Material Map
Piles
Flux Sources
Discharge Planes
Job Submission
Job Monitor
Number of Computational Cells Across Smallest Pile/Flux-Source ...
20
Scale Parameters
Scale Simulation
Scale Length
Maximum Number of Time Steps
Maximum Time
Time Between Results Output
Time Between Saves
Adapt the Grid
Visualizaton Output Type(s)
Import/Export
Input
Run Tool
Result:
Map of maximum flow depth
9.168e+06
9.167e+06
9.166e+06
9.165e+06
9.164e+06
9.163e+06
9.162e+06
436000
437000
438000
439000
440000
441000
442000
30
25
20
15
10
5
0
2 results
Parameters...
Clear
< Input
Applet VncViewer started

Resources: Offline Tools

Offline Tools | Go

Tag	Resources (Sort by Title)	Info
[All]	Conflow 1.0.5	Select a resource to see details.
ballistics (1)	conflow linux fortran version	
Bubbles in magma (1)	dMODELS: A MATLAB software package for ...	
CAPRA (1)	DOASIS KML Toolbox v1.2	
conduit flow (1)	dWind	
Deformation modeling (1)	eject model	
disequilibria (1)	Matlab Codes for Volcanology - Magma ...	
DOAS (1)	Matlab Codes for Volcanology - Magma ...	
DOAS traverses (1)	Matlab Codes for Volcanology - Stokes ...	
DOASIS (1)	New PCQ Runs for Bent Model	
eruption modeling (1)	Normalising datasets in Matlab	
eruption models (1)	OMIplot	
explosive eruptions (1)	Plumeria 2.3.1	
Eyjafjallajokull (1)	Plumeria 2.3.1--Fortran open-source ...	
Gas emissions (1)	SlopeCalc	

Top Rated

The following are top-rated resources of this type.

Tephra2 Source Code Edit

★★★★★ 0.0 out of 5 stars

14 Jul 2010 Offline Tools Contributor(s): Chuck B Connor, Leah Michelle Courtland

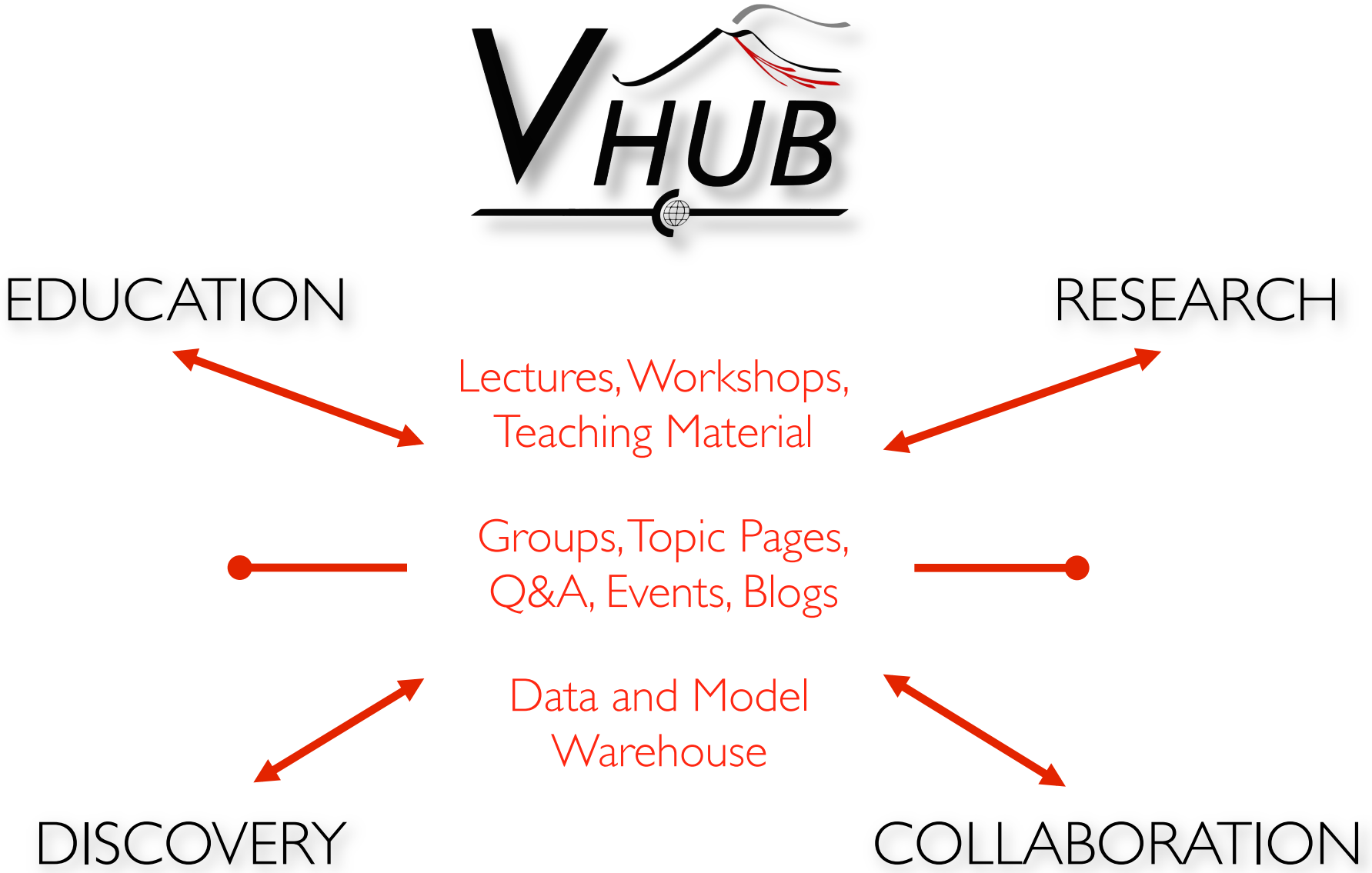
Tephra2 uses the advection diffusion equation to forecast tephra dispersion in a given location based on a user-defined set of eruptive conditions. Available are: 1-processor version running under linux: tephra2.tar.gz (default) 1-processor version running under cygwin: tephra2.zip To Install the ...

dWind Edit

★★★★★ 0.0 out of 5 stars

27 Jul 2010 Offline Tools Contributor(s): Seb Biass

Wind is a crucial input for any tephra dispersal model. The NOAA NCEP Reanalysis 1 database provides up to 4-daily measurements for 17 pressure levels, from 1948 to present, but the downloading process from this database is time-consuming and the conversion to a shape readable by most tephra ...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Lunar Crater Volcanic Field Group

About the Group

Show Public Description (+)

Online working group for the Lunar Crater Project Team.

Group Members

View all members →

Amanda Rachel Hintz


Peter Johnson


Eugene Smith

Sonja Mae Melander

Jamal Amin

Christine Rasoazanamparany

Joaquin Alberto Cortes

Group manager

Show Manager Controls▾

Managers:
Greg A Valentine, Dawn Catherine Sweeney Ruth, Amanda Rachel Hintz, Elisabeth Widom, David Kuentz, Joaquin Alberto Cortes, Christine Rasoazanamparany, Eugene Smith

Members:
14

Discoverability:
Visible

Policy:
Invite Only

Created:
16 Sep. 2010

Tags:
[none]

VHUB *Collaborative volcano research and risk mitigation*

ALVO

Overview
Overview- English
Members
Wiki
Resources
Discussion
Blog
Wish List
Calendar

Asociación Latinoamericana de Volcanología, ALVO

About the Group

Show Public Description (+)

La Asociación Latinoamericana de Volcanología (ALVO) fue creada formalmente el 7 de Noviembre de 2010, en Manizales, Colombia. Su creación fue anunciada durante la conmemoración del aniversario número 25 de la erupción del volcán Nevado del Ruiz. Durante esta conferencia, y con la participación de delegados de México, Guatemala, El Salvador, Nicaragua, Costa Rica, Panamá, Colombia, Ecuador, Perú, Argentina y Chile, el comité ejecutivo fue electo como sigue:

Presidente
Hugo Delgado Granados (UNAM, México)

Vice Presidente
José Viramonte (UNSA-CONICET, Argentina)

Secretario General
Martha Calvache (INGEOMINAS, Colombia)

Tesorero
Sofía Navarro (INGEOMINAS, Colombia)

Consejos Regionales
* Norteamérica : Enrique Guevara (CENAPRED, México)
* Centroamérica : María Martínez (OVSICORI, Costa Rica)
* Sudamérica Norte : Gloria Patricia Cortés (INGEOMINAS, Colombia)
* Sudamérica Sur: Felipe Aguilera (Universidad de Atacama, Chile)

El principal propósito de ALVO es reforzar y promover los lazos entre volcanólogos latinoamericanos. ALVO también promueve la colaboración internacional entre países latinoamericanos y otros países del mundo.

Group Members

View all members →


Jose L. Palma


Felipe Aguilera


Ramón Espinasa-Pereña


Nick Varley


Hugo Delgado-Granados

Joomla Admin
Show Admin Controls ▼

Managers:
Jose L. Palma, Hugo Delgado-Granados, Felipe Aguilera

Members:
5

Discoverability:
Visible

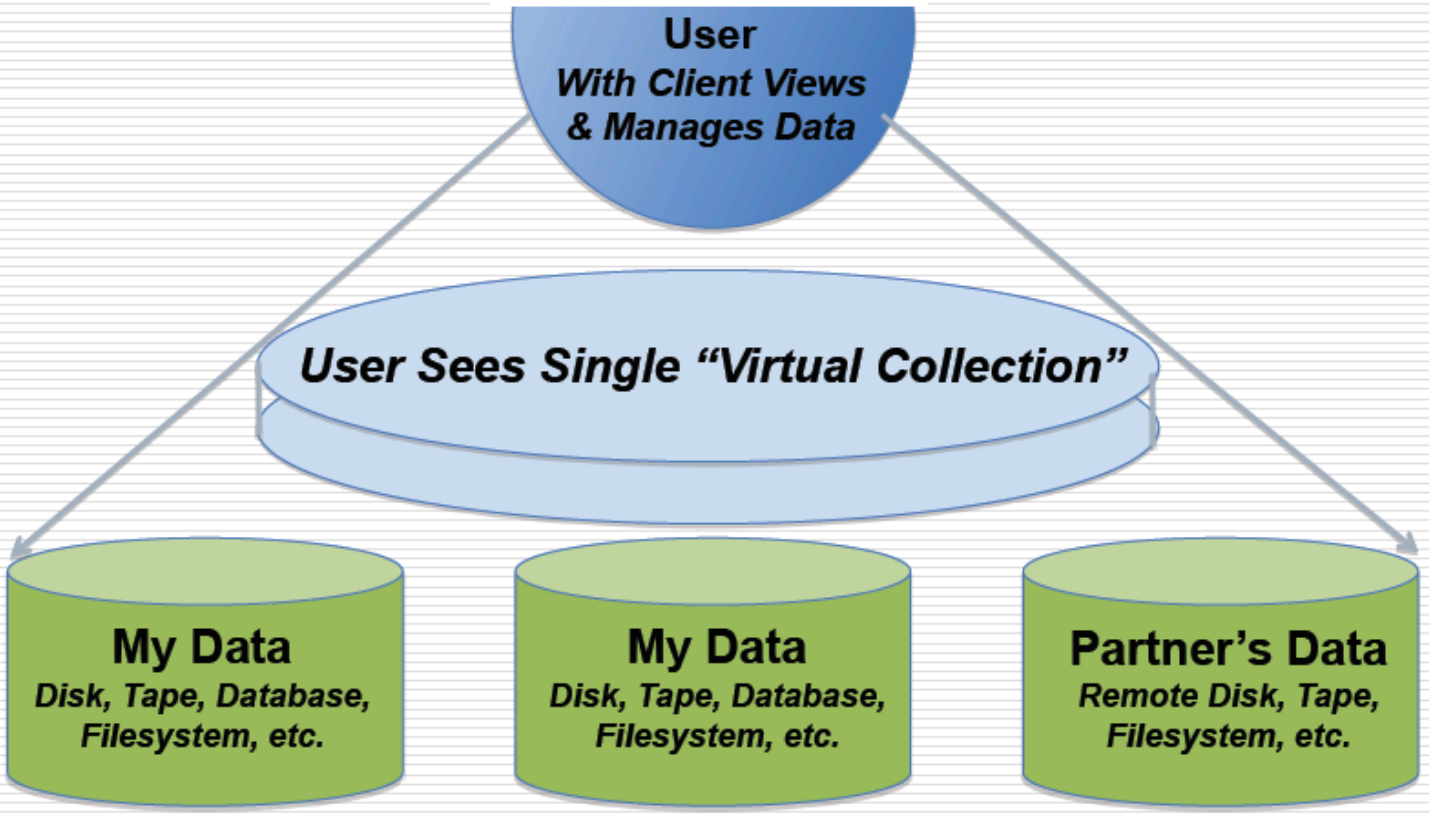
Policy:
Restricted

Created:
21 Nov. 2010

Tags:
ALVO Argentina Chile Colombia Costa Rica Ecuador El Salvador Guatemala Latin America Mexico Nicaragua Panama Peru

PASI Workshop Tephrafalloutexercise

iRODS Shows Unified "Virtual Collection"



The iRODS Data System can install in a "layer" over existing or new data, letting you view, manage, and share part or all of diverse data in a unified Collection.

D·I·C·E i·R·O·D·S THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL UCSD NSF THE NATIONAL ARCHIVES

from https://www.irods.org/pubs/iRODS_Overview_0903.pdf

VHUB

Vhub.org is a place to find volcanology-related resources,

and

a venue for you to use to disseminate tools, teaching resources, data,

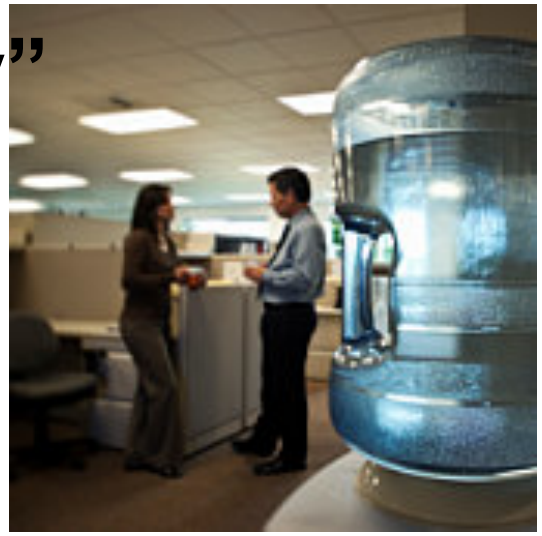
and

an online platform to support your collaborative efforts.

Also supporting – model benchmarking exercises, training workshops

But, why does this work?

Simulation tool usage is “sticky”



e.g. 518 users ran an average of 51 jobs
(IAVCEI2013 had ~1000 attendees)

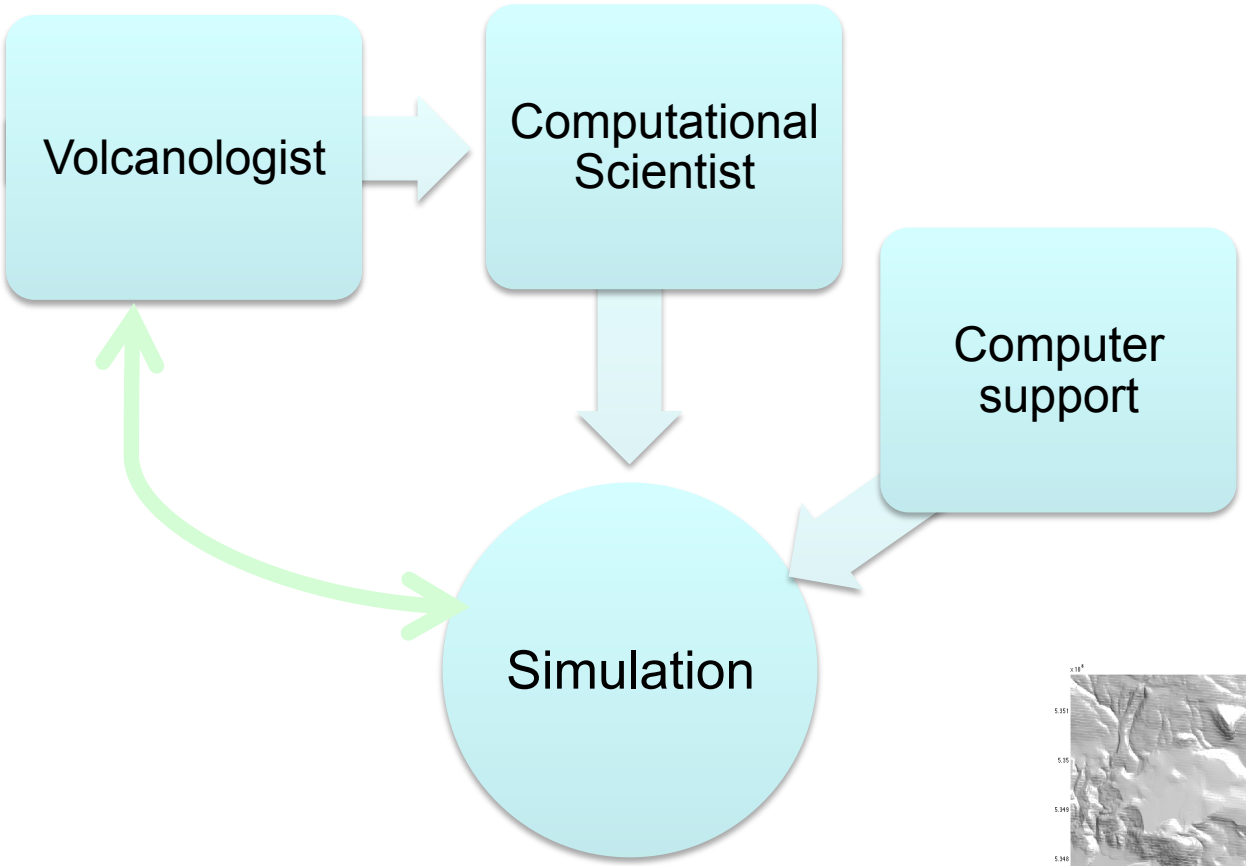
Online usage dominant for many tools

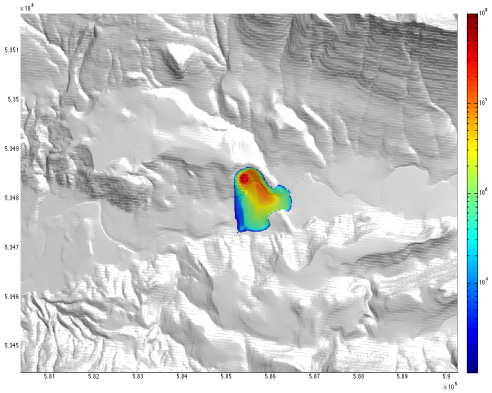
Workshops themed @ specific tools are easy to put on and users soon become trainers – bootstrapping!

Most simulation users are now data and collaborations users!

VHUB

WORKFLOW FOR VOLCANOLOGIST -- preVhub

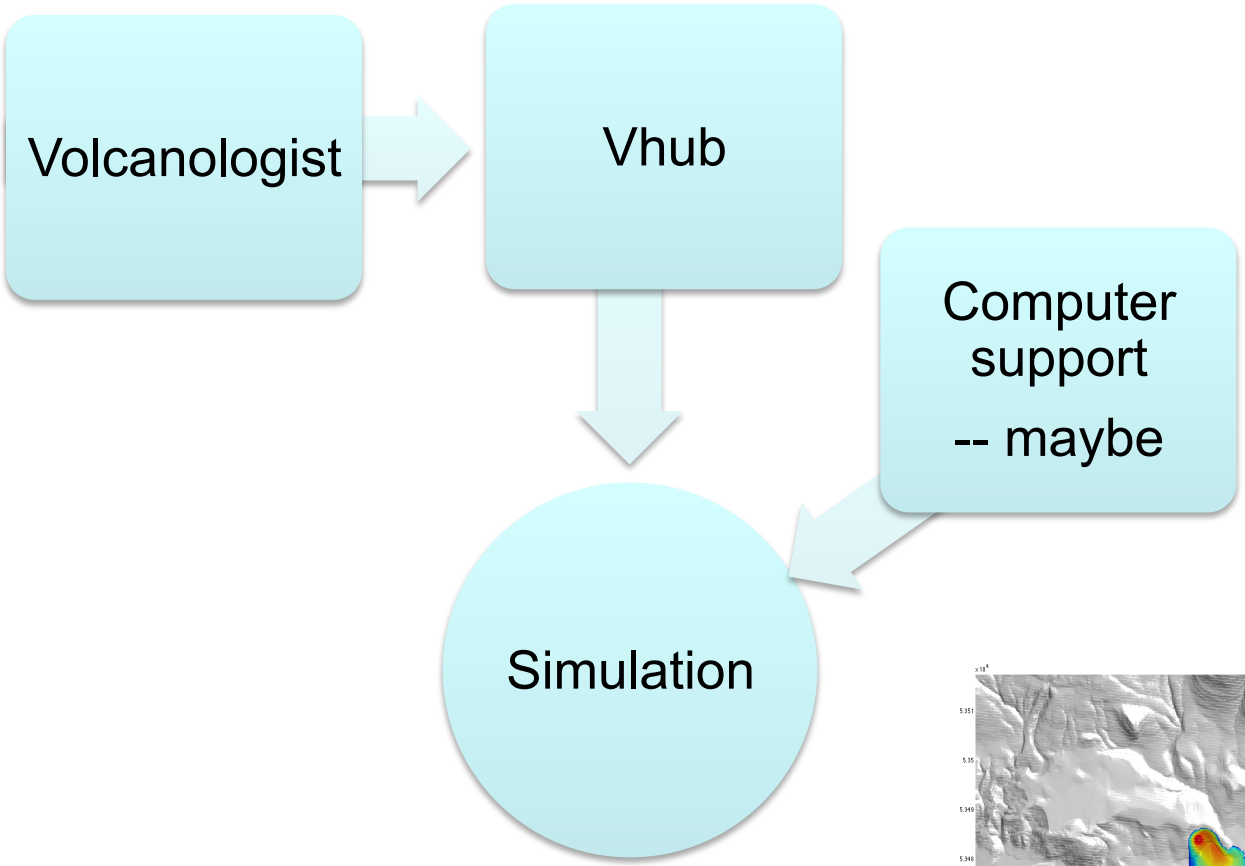


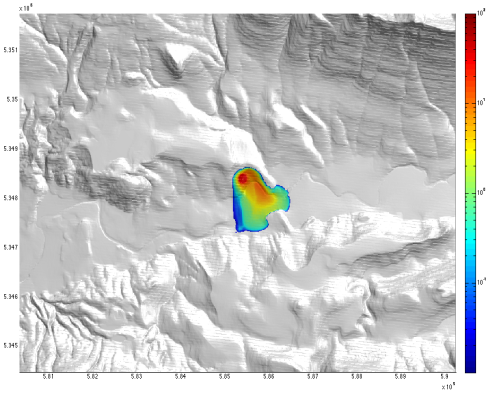


3 weeks and many meetings later …

VHUB

WORKFLOW FOR VOLCANOLOGIST -- postVhub





3 hours and NO meetings later …

BUT I AM A TOOL DEVELOPER!

Role of Online Platforms, Communications and Workflows in Developing Sustainable Software for Science Communities

Abani K. Patra,
M. D. Jones, T. Kosar, S. M. Gallo and K. Marcus,
Center for Computational Research, University at Buffalo, SUNY, Buffalo, NY 14260

C. B. Connor, S. Charbonnier and L. J. Connor,
University of South Florida, Tampa, FL

Abstract

http://dx.doi.org/10.6084/m9.figshare.1112569

- Reference Implementation!
- Clear Communication of Tool Limitations and JIT support
- Support verification and validation beyond the eyeball norm including community comment

VHUB

BUT I AM A TOOL DEVELOPER!

- Supporting scientific application users – varying level of computing skill causes a lot of support issues
- Tight control of source release and close coupling to documentation and community support
- TITAN2D viewer – developed by application user

VHUB

SOME CHALLENGES

- Model Abuse!!!
- Need to support science workflow – mechanistic support for running tools can be dangerous
- “What can the model NOT DO?
- Training and execution need to be interspersed
- Support for user group organization in a bottom up and top down – “master gamers have the power”

VHUB

SOME CHALLENGES

- Distributed Data
- Distributed resource identification
- Many capabilities still not known to many users
- But the biggest of them all
  - **the “human workflow”**
- …

Intelligent System for Interpreting the Pattern of Volcanic Eruptions

the “human” workflow

GALINA L. ROGOVA
MARCUS L. BURSIK
SARA HANSON-HEDGECOCK

The overall goal of the research presented in this paper is to design an intelligent system to aid geologists in processing complex geologic characteristics for interpreting eruption patterns, and thereby to aid eruption forecasting for volcanic chains and fields. The objective of this paper is twofold. First it describes applications of data fusion techniques to designing such an intelligent system. The paper discusses the system architecture and applicability and benefits of evidential decision fusion methods for processing uncertain rock characteristics. Second, it introduces a new evidential method of combining several clustering results and presents the results of application of this fusion method to clustering geochemical data characterizing volcano magma chambers.

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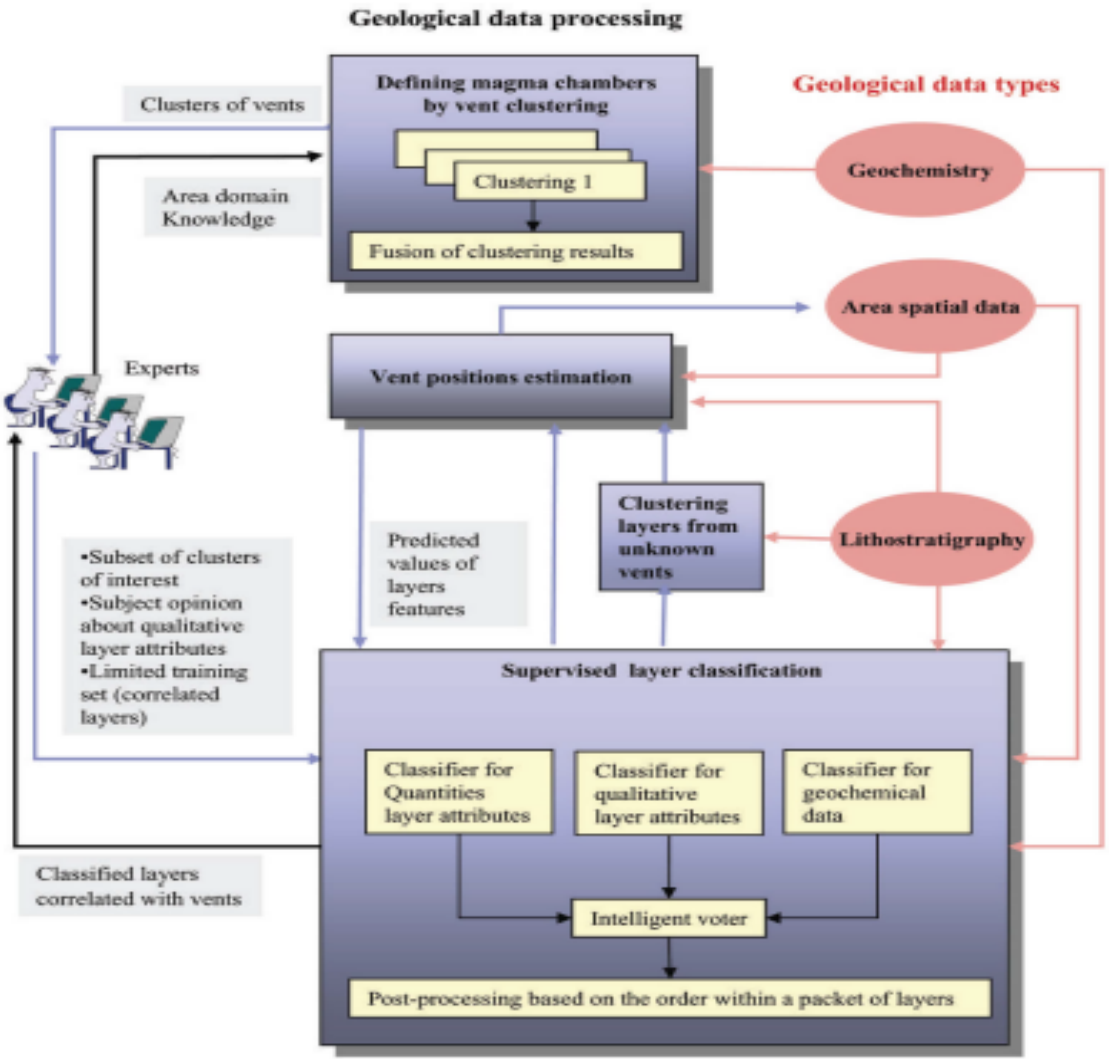
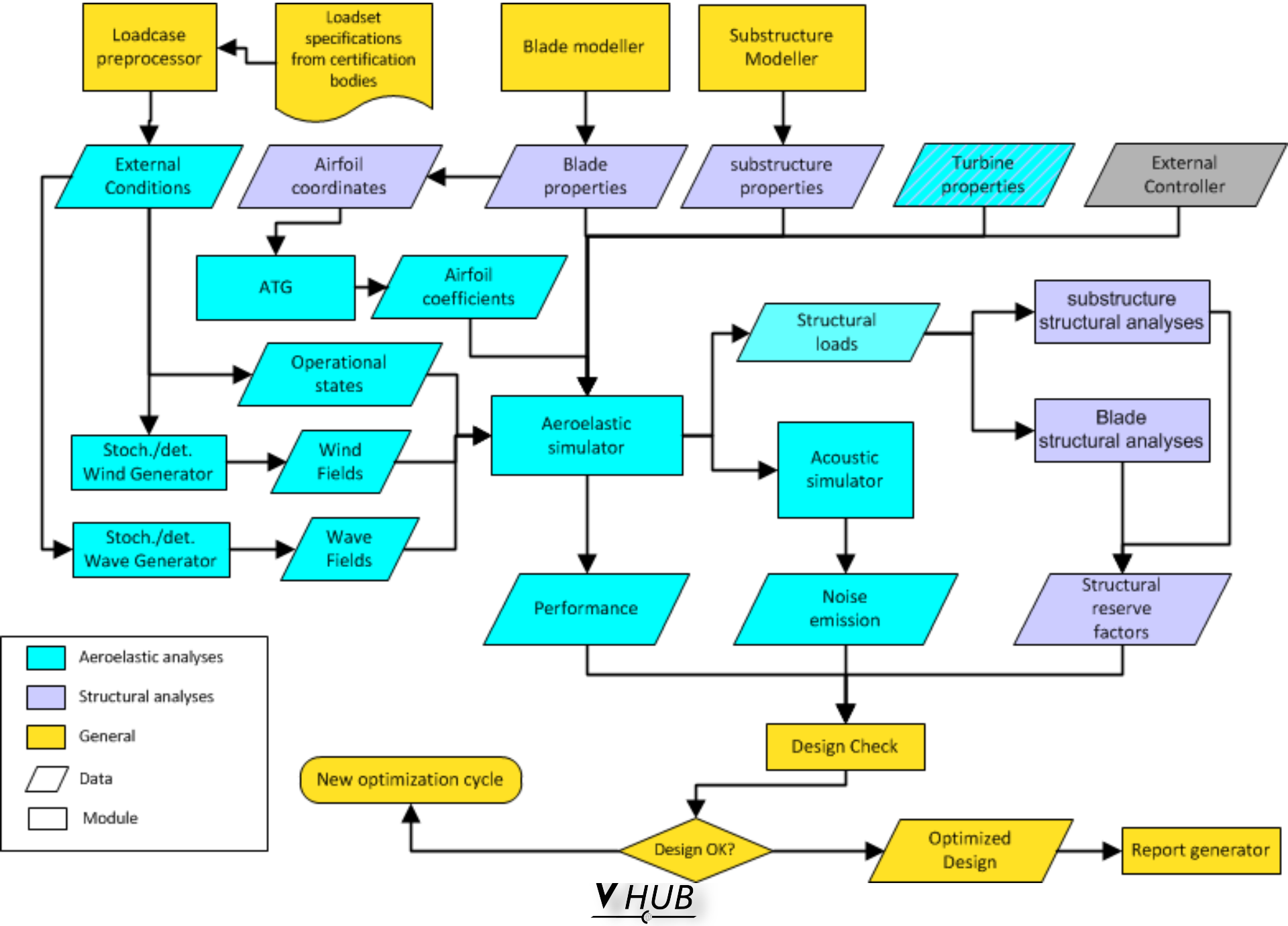

Geological data processing
Defining magma chambers by vent clustering
Clustering 1
Fusion of clustering results
Clusters of vents
Area domain Knowledge
Experts
Geological data types
Geochemistry
Area spatial data
Vent positions estimation
Clustering layers from unknown vents
Lithostratigraphy
Predicted values of layers features
•Subset of clusters of interest
•Subject opinion about qualitative layer attributes
•Limited training set (correlated layers)
Supervised layer classification
Classifier for Quantities layer attributes
Classifier for qualitative layer attributes
Classifier for geochemical data
Intelligent voter
Post-processing based on the order within a packet of layers
Classified layers correlated with vents


Loadcase preprocessor
Loadset specifications from certification bodies
Blade modeller
Substructure Modeller
External Conditions
Airfoil coordinates
Blade properties
substructure properties
Turbine properties
External Controller
ATG
Airfoil coefficients
Structural loads
substructure structural analyses
Operational states
Aeroelastic simulator
Blade structural analyses
Stoch./det. Wind Generator
Wind Fields
Acoustic simulator
Stoch./det. Wave Generator
Wave Fields
Performance
Noise emission
Structural reserve factors
Aeroelastic analyses
Structural analyses
General
Data
Module
Design Check
New optimization cycle
Design OK?
Optimized Design
Report generator
V HUB

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2007, Vol. 35, No. 5, 1874–1906
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COMPUTER MODEL VALIDATION WITH FUNCTIONAL OUTPUT[1]

BY M. J. BAYARRI, J. O. BERGER, J. CAFEO, G. GARCIA-DONATO, F. LIU, J. PALOMO, R. J. PARTHASARATHY, R. PAULO, J. SACKS AND D. WALSH

Universitat de Valencia, Duke University, General Motors, Universidad de Castilla-La Mancha, Duke University, Universidad Rey Juan Carlos, General Motors, ISEG Technical University of Lisbon, National Institute of Statistical Sciences and Massey University

The six steps are (1) defining the problem (inputs, outputs, initial uncertainties); (2) establishing evaluation criteria; (3) designing experiments; (4) approximating computer model output; (5) analyzing the combination of field and computer run data; (6) feeding back to revise the model, perform additional experiments, and so

QUESTIONS?