

The Geohazard Supersites Partnership

Supplement to the
White Paper
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Purpose of Supplement

The supplement to the White Paper is concerned with details of the implementation of the Geohazards Supersites partnership. The following needs to be clarified:

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- Data provision mechanisms
- Governance Structure: How will be the interaction between CEOS and the SAC? How to include in-situ data provider.
- Partnership members. Is ASI going to be a member?
- Contributors to White paper: Are there contributors at JAXA and ASI?
- Bylaws need to be updated once Governance Structure and CEOS's role has been clarified.

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Japanese in-situ data provider. All data are already publicly available but we need contacts at National Research Institute for Earth Science and Disaster Prevention (NIED), Japanese Meteorological Agency (JMA), Geospatial Information Authority of Japan (GSI), Geological Survey of Japan (GSJ), AIST.

This supplement is a fluid document and will be modified when needed.

Supplement A: Funding

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Supersites Office

The Supersites Office is co-funded in collaboration by NASA and ESA. The current Supersites Office at Unavco is located in the USA and funded by NASA. Some of the functions of the Supersites Office are expected to transition to the European Plate Boundary Observatory and will then be co-funded by ESA. Unavco is primarily funded by the U.S. National Science Foundation.

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ITC infrastructure

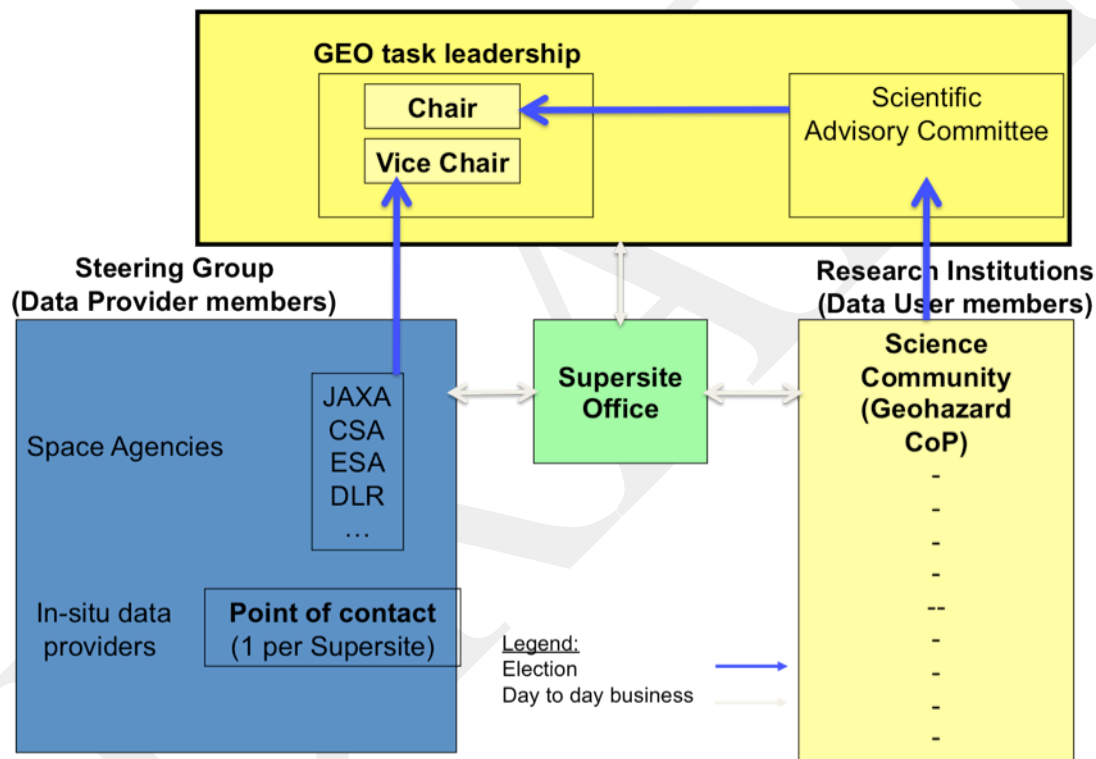
Most data contributors use their own infrastructure to provide open data access to the Supersite user community. Some in-situ data are already publicly available with data centers funded through other means. Several data centers such as Orpheus, Unavco and Iris have expressed their willingness to host data (ground-based and SAR) at no cost.

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Supplement B: Proposed governance structure

60 The Participating Organizations together with the Data Users (the Geohazard Community of Practice or GCoP) form the membership of the Geohazard Supersites partnership. There are two types of members: Data User members and Data Provider members (for satellite and in-situ data). The partnership is led by a Scientific Advisory Committee (SAC) and a Steering Group (SG). The SAC is elected by the Data User members for two-year terms and consists of six members with equal geographic distribution (two members from Asia/Oceania, Europe/Africa and the Americas). The SG consists of the Data Provider members with representatives of the Space Agencies and Point-of-Contacts for each Supersite (affiliated with in-situ data providers whenever possible). The SAC and SC
 65 elect the Partnership's Chair and Vice Chair (the GEO task leadership), respectively. The governance structure of the Geohazard Supersites is summarized in the Bylaws (Appendix C).

Proposed structure of Consortium



70 The responsibilities of the *Scientific Advisory Committee* are:

- To select Supersite candidates.
- To define scientific objectives
- To define Earth Observations tasks to be carried out by Steering Group.
- To define the metrics for the transition from Supersite candidate to Supersite.
- 75 • To check the metrics and to report failures and achievements.
- To define standards and formats (for higher level products).

The responsibilities of the *Steering Group* are:

- To provide the satellite and in-situ data.
- To respond to requests of the Scientific Advisory Committee.
- 80 • To accept or deny newly proposed Supersites in view of data provider capacities.
- To characterize data policies supporting (e.g. half-year delay for in-situ volcano data)

The responsibilities of the *Point-of-Contacts* (within the Steering Group) are:

- To define satellite data requirements for each Supersite.
- To communicate with Space Agencies and oversee the acquisition of space-based data (background acquisition plans, satellite tasking, completeness of archived data)
- 85 • To take decisions about space-based data coverage given limited satellite resources.
- To ensure availability of in-situ data (if affiliated with an in-situ data provider)
- To assist the Supersite Office in reporting of Science results

The responsibilities of the *Supersites Office* are:

- 90 • To maintain the Supersites website and data portal (data ordering)
- To accommodate specific requests of participating organizations for data dissemination, access and reporting.
- To assist participating organization with data acquisition and provision (the Supersite Office can act as an order desk and access SAR data production systems for satellite tasking and data ordering).
- To coordinate the partnership membership (conduct elections, organize meetings, maintain e-mail lists).
- 95 • To report science results and data usage to participating organizations.

Ad-Hoc Scientific Advisory Committee and Steering Group members

100 The following individuals serve on the Ad-Hoc Scientific Advisory Committee and on the Steering Group. The SAC members be elected no later than six month after all the participating organizations have agreed to this White Paper.

GEO task leadership

105 Falk Amelung, University of Miami, USA, Chair of Partnership, representative of SAC
Wolfgang Lengert, ESA, Vice Chair of Partnership, representative of SG

Scientific Advisory Committee:

110 Falk Amelung, University of Miami, USA, Chair (Americas representative)
Eric Fielding, Jet Propulsion Laboratory, Pasadena, USA (Americas representative)
Masato Furuya, Hokkaido University, Sapporo, Japan (Asia/Oceania representative)
Shinji Toda, Kyoto University, Japan (Asia/Oceania representative)
Andy Hooper, Delft University of Technology (TU Delft), Netherlands (Europe/Africa representative)
Tim Wright, University of Leeds, UK (Europe/Africa representative)

Steering Committee:

115 **Space Agencies**
Wolfgang Lengert, ESA
Michael Eineder, DLR, Germany
Guy Seguin, CSA, Canada

120 Osamu Ochiai, Jaxa, Japan
Steven Hosford, CNES, France
Craig Dobson, NASA, USA

Point-of-Contacts

125 Giuseppe Puglisi, INGV, Italy (Etna Supersite)
Mike Poland, USGS (Hawaii Supersite)
Semih Ergintav, Tubitak (Istanbul Supersite)
Ken Hudnut, USGS (Los Angeles Supersite)
Herb Dragert, GSC (Vancouver-Seattle Supersite)
130 Sven Borgstrom (Vesuvius-Campi Phlegrei Supersite)
?? (Tokyo Supersite)

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Supplement C: Data request summary

135 The following data sets are requested for all the selected Supersite candidates. A detailed granule list for the imagery expected in 2010 is in Supplement H

Agency	Data set	# of frames	Comments and Actions
2010			
ESA	ERS, Envisat for all Supersites		Done.
DLR	TSX for Haiti		In progress
CSA	Rsat-2 for Haiti	?	Need Haiti listing and data. (Action: CSA)
	Rsat-1 for Hawaii, LA, Vancouver (archived data)	~1500	Permission needed to transfer imagery from WinSAR/ASF to Supersites. (Action: CSA)
JAXA	PALSAR for Haiti quake	16	Data with precise orbits needed.
	PALSAR for Wenchuan quake	144	Listing in Appendix F.
	PALSAR for Chile quake	186	
	PALSAR for new events	?	(Action: JAXA)
ASI	Cosmo-Skymed for Haiti, Cosmo-Skymed for Wenchuan	?	Need listing and data. (Action: ASI)
CNES	Spot-5 for Haiti	2	In progress
First semester 2011 (prior to CEOS SIT-26?) (*)			
DLR	TSX for all Supersites		In progress
CSA	Rsat-2 for Hawaii, Etna, Vesuvius		Satellite tasking needed. (Action: CSA)
	Continue Haiti Rsat-2	~200	Satellite tasking needed. (Action: CSA)
	Rsat-1 for Etna, Vesuvius		Repatriation to CSA needed (Action: CSA)
JAXA	PALSAR for Hawaii, Etna, Vesuvius	~60	Imagery for 2 frames per site. See link to listings in Appendix F. (Action: JAXA)
	Postseismic PALSAR for Wenchuan		
	JERS-1 for all Supersites	660	
		~100	
ASI	Cosmo-Skymed for Etna, Vesuvius	?	Need listing and data. (Action: ASI)
CNES	Spot-4,5 for several recent earthquakes	?	In progress.
Second semester 2011 (prior to CEOS and GEO 2011 Plenaries) (*)			
CSA	Rsat-2 for Tokyo, Istanbul, LA, Vancouver	~200	Satellite tasking needed. (Action: CSA)
	Rsat-1 for Istanbul, Tokyo	~50	Repatriation to CSA needed (Action: CSA)
JAXA	PALSAR for Tokyo, Istanbul, LA, Vancouver	~80	Imagery for 2 tracks per Supersite. See link to listings in Appendix E. (Action: JAXA)
	Complete PALSAR coverage for all Supersites	~1000	Imagery for all tracks covering Supersites
ASI	Cosmo-Skymed for Hawaii, and other Supersites	?	Action: ASI

(*) Details of data provision will be discussed between Steering Group and Scientific Advisory Committee to maximize science output given space agency constraints.

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Supplement D. Partnership members

145 This supplement lists the initial members of the Geohazard Supersites partnership. There are two type of members (see Bylaws, Article 2, section 1), data user members and data provider members. The participating organizations fall under the category of data provider members. They form the Advisory Committee of the partnership. It is recognized that the data of some participating organizations are already open and free access (e.g. Canadian Geological Survey, Unavco, Geonet, etc.). These organizations may opt out of the participation in the Advisor Committee teleconferences.

150 D.1. Participating organizations providing satellite data

1. European Space Agency (ESA)

Satellites: ERS-1,2, Envisat, Sentinel-1 (starting 2012)

155 *Mechanism:* Data are provided through a Category-1 research project with the GEO Secretariat Director as Principal Investigator entitled: “Geohazard Supersites: SAR data for GEO task DI-09-01”. ESA’s Earth Observation help desk adds on request new Supersite scientists as Co-Principal Investigator to this project who sign ESA’s Terms and Conditions for the Utilization of Data under the Category-1 scheme.

Data Dissemination: The Supersite office orders the data through ESA’s EOLI-SA system and places them into ESA’s virtual archive. From there imagery is available for download to approved co-investigators through EOLI-SA and/or the Supersite website (password protected).

160 *Reporting:* On behalf of GEO the Supersite office reports to ESA according to ESA’s Terms and Conditions.

Comments: ESA already has provided data for all the Supersites. In addition, ESA provides data for several Natural Laboratory sites. The Supersites provides an opportunity for ESA to provide data relevant for geohazard research of the Sentinel-1 satellite (to be launched in 2012) which is part of the Global Monitoring for Environment and Security (GMES) initiative.

165 *Contact:* Wolfgang Lengert (wolfgang.lengert@esa.int)

2. German Space Agency (Deutsches Zentrum für Luft und Raumfahrt, DLR)

Satellites: TerraSAR-X and Tandem-X

170 *Mechanism:* Data are provided through DLR’s Science Service system. For each Supersite a Principal Investigator is responsible for proposal writing, ordering of SAR acquisitions (tasking), execution control and reporting to DLR (Super-PI). Each Supersite scientist writes individual proposals to DLR referring to the Super-PI proposal. Supersite scientists will obtain individual user IDs and passwords to access the data from DLR’s system.

Data Dissemination: All data will be obtained through DLR’s secure system. The Costs of Fulfilling User Requests (COFUR) will be waived until a quota set by DLR is reached.

175 *Reporting:* All PIs (Super-PIs and regular PIs report directly to DLR.

Comments: TerraSAR-X data cannot be placed in the Virtual Archive because of German security regulations. DLR encourages the formation of small research groups (<=5 Co-PIs) to keep the load on the production system small.

180 *Contact:* Michael Eineder (Michael.Eineder@dlr.de)

3. Japanese Space Exploration Agency (JAXA)

Satellites: JERS-1, ALOS-1

Data Dissemination: For selected cases the data have been placed in ESA’s virtual archive from where they are available for download to approved co-investigators (password protected, downloads are recorded).

185 *Reporting:* The Supersite office reports on behalf of GEO to Jaxa.

4. Canadian Space Agency (CSA)

Satellites: Radarsat-1,2

Reporting: The Supersite office reports on behalf of GEO to CSA.

190 **Contact:** Guy Seguin (guy.Seguin@asc-csa.gc.ca)

5. Agenzia Spaziale Italiana (ASI)

Satellites: Radarsat-1,2

Reporting: The Supersite office reports on behalf of GEO to CSA.

195 **Contact:** Guy Seguin (guy.Seguin@asc-csa.gc.ca)

6. Centre Nationale d'Etudes Spatiales (CNES), France

Satellites: SPOT optical

200 **Mechanism:** CNES has agreed to participate. The actual mechanism is currently under review.

Contact: Steven Hosford (steven.hosford@cnes.fr)

7. National Aeronautics and Space Administration (NASA), USA

205 **Satellites:** none, airborne UAVSAR.

Mechanism: Open and free. UAVSAR data openly available from the Alaska Satellite Facility. Open access to all data for DESDynI.

Contact: Craig Dobson (craig.dobson@nasa.gov)

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D.2 Participating organizations providing ground-based data

1. Tokyo-Mt. Fuji, Japan

215 Potential partners in the Geohazard Supersites are NIED (Hinet, seismic), JMA (other seismic), GSI (GPS) and GSJ. Some of the ground-based data are openly available (HINet), others are available for reproduction costs (GPS older than 1 year). Others are not open access (for volcanoes).

220 These organizations are not yet aware of the benefits in participation in the Supersites. It is not appropriate to push them to participate at the initiation of the Supersites. The Japanese InSAR community will make the institutions gradually aware of the Supersites. (text from the minutes of the Supersite-breakout session at the 4th ALOS PI symposium, November 2010, Tokyo).

2. Los Angeles, USA

225 **Seismic networks**

Southern California Seismic Network (SCSN) (operated by Caltech and USGS)
ANZA network (Scripps Institution of Oceanography, SIO)

Geodetic networks

230 Earthscope's Plate Boundary Observatory (including the USGS's Nucleus network, formerly SCIGN)
California Real Time Network (operated by Scripps Institution of Oceanography)
Creep meter network.

235 **Data access.** Open, real-time data access for all continuously recording geophysical instruments.

Comments: The United States Geological Survey relies heavily on the scientific community to help with the data analysis and interpretation in the case of a major earthquake (efforts coordinated by the Southern California Earthquake Center, SCEC).

240 **Participating Organizations:**
United States Geological Survey (USGS)
Southern California Earthquake Center (SCEC)

Point-of-contact: Ken Hudnut (hudnut@usgs.gov)

245 **3. Vancouver-Seattle, Canada and USA**

Seismic networks

- Western Canada Seismographic Network (operated by the Geological Survey of Canada)
- Pacific Northwest Seismic Network (PNSN) (operated by Caltech and USGS)

250 **Geodetic networks:**

- Western Canada Deformation Array (WCDA) (operated by the Geological Survey of Canada)
- Pacific Northwest Geodetic Array (Panga) (operated by Central Washington University, USA)
- Earthscope's Plate Boundary Observatory (PBO)

255 **Data access.** Open, real-time data access for all continuously recording geophysical instruments.

Participating Organizations:
Geological Survey of Canada (GSC)
United States Geological Survey (USGS)

260 **Point-of-contact:** Herb Dragert, GSC (Herb.Dragert@NRCan-RNCan.gc.ca), Craig Weaver (weaver@usgs.gov).

4. Istanbul, Turkey

Seismic networks

- 265
- The dense broadband seismological networks in Marmara, Aegean and Eastern part of Turkey (operated by TUBITAK MRC Earth and Marine Research Institute)
 - National Seismological Network (operated by Bogazici University, Kandilli Observatory and Earthquake Research Institute)

Geodetic networks

- 270
- The dense CGPS networks around the critical fault zones in Marmara, Aegean and Eastern part of Turkey (operated by TUBITAK MRC Earth and Marine Research Institute)
 - The more than 100 survey GPS sites around the critical fault zones and measure in each year (operated by TUBITAK MRC Earth and Marine Research Institute)
 - Survey sites around North Anatolian Fault Zone (operated by Bogazici University, Kandilli Observatory and Earthquake Research Institute)
- 275
- Turkish CGPS network (operated by the General Command of Mapping (GCM) and the General Directorate of Land Registry and Cadastre)
 - Tilt meter network (operated by TUBITAK MRC Earth and Marine Research Institute)

Other networks

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- Soil Radon Observation networks (operated by TUBITAK MRC Earth and Marine Research Institute)
 - Geochemical networks (operated by TUBITAK MRC Earth and Marine Research Institute)
 - Gravity Change networks (operated by TUBITAK MRC Earth and Marine Research Institute)

Participating Organizations:

285 TUBITAK Marmara Research Center, Earth and Marine Research Institute , Gebze
Kultur University, Istanbul
KOERI, Kandilli Observatory and Earthquake Research Institute, Bogazici University,
Istanbul

Plans for Data access

290 The responsible group of the networks is the main contact point for each data set. However, under the EPOS,
TUBITAK and Kandilli data will be open to EPOS group. The legal contact point is TUBITAK in EPOS for Turkey.

There are two type of networks: National scale and small scale but focused to critical zones. The main policy is
open data access to national scale networks. Focused networks run by research Institutes and Universities is free
after two years of the end of the project. Some project-based data may require some particular negotiations with the
P.I.

Point-of-contact:

300 Semih Ergintav, TUBITAK MRC Earth and Marine Research Institute (Semih.Ergintav@mam.gov.tr)
Kamil Eren, Kultur University (keren@ags-group.com)
Haluk Ozener, Bogazici University, Kandilli Observatory and Earthquake Research Institute (Ozener@boun.edu.tr)

5. Hawaii, USA

305 The geophysical observation networks of the Hawaiian volcanoes are operated by the Hawaii Volcano Observatory
(HVO) of the United States Geological Survey (USGS).

Observation networks

310 Short period seismic network
Broadband seismic network
Continuous GPS network (in collaboration with University of Hawaii and Stanford University)
Tilt meter network
Gas Observation network
Gravity Change

Data access.

315 GPS network: All data available from Unavco
Short-period: epicentral locations from ANSS

Participating Organizations:

320 United States Geological Survey (USGS)

Point-of-contact: Mike Poland, USGS

6. Mt Etna, Italy

325 The geophysical observation networks of Mt. Etna volcano are operated by the Istituto Nazionale di Geofisica e
Vulcanologia in Catania, Sicily, Italy (INGV-CT).

330 ***Observation networks***

Short period seismic network
Broadband seismic network
Continuous GPS network
Campaign GPS network

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Participating Organizations:

Istituto Nazionale di Geofisica e Vulcanologia, Catania (INGV-CT)

Point-of-contact: Giuseppe Puglisi, INGV (puglisi-g@ct.ingv.it)

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7 . Vesuvius/Campi Flegreii, Italy

The geophysical monitoring networks of Vesuvius/Campi Flegreii are operated by the Istituto Nazionale di Geofisica e Vulcanologia in Naples, (INGV-OV), also known as the Osservatorio Vesuviano.

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Participating Organizations:

Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano (INGV-OV)

Point-of-contact: Sven Borgstrom (sven.borgstrom@ov.ingv.it)

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8 . Wenchuan, China

The principal seismic network that recorded the earthquake and the aftershocks are the local Sichuan Seismographic Network operated by the Earthquake Administration of Sichuan Province and the National Chinese Seismic Network. Temporal networks were installed after the earthquake by eight institutions.

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Participating Organizations:

Seismic networks:

1. Earthquake Administration of Sichuan Province
2. Institute of Geophysics of the China Earthquake Administration, Beijing.
3. Earthquake Administration of Chongqing Municipality
4. Earthquake Administration of Gansu Province
5. Earthquake Administration of Shaanxi Province
6. Earthquake Administration of Hubei Province
7. Earthquake Administration of Yunnan Province
8. Earthquake Administration of Qinghai Province

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GPS networks:

1. Center of Crustal Motion Observation Network of China
2. Institute of Seismology, Chinese Earthquake Administration
3. Institute of Geology, Chinese Earthquake Administration
4. Earthquake administration of Sichuan Province
5. Institute of Earthquake Science, Chinese Earthquake Administration

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D.3. Initial Data User members

The following research institutions are currently Co-Investigators in the Supersites Project. Most of these institutions will be invited to join the partnership as a Data User Member subject to approval by the Supersites Executive Committee.

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Americas:

Argentine National Institute of Agricultural Technology	Argentina	Diego De Abelleira	ddeabelleira@cnia.inta.gov.ar
Universidad Nacional de Cuyo, Mendoza	Argentina	Pablo A. Euillades	peuillad@cediac.uncu.edu.ar
Southern Alberta Institute of Technology	Canada	Cristi Birch	cristi.birch@edu.sait.ca
University of Western Ontario, London	Canada	Kristy F. Tiampo	ktiampo@seis.es.uwo.ca
3V Geomatics Inc.	Canada	Adrian McCardle	amccardle@3vgeomatics.com
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Cornell University, Ithaca, New York	USA	Matt Pritchard	mp337@cornell.edu
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Jet Propulsion Laboratory, Pasadena	USA	Eric J. Fielding	eric.j.fielding@jpl.nasa.gov
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Asia/Oceania

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Europe/Africa

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Supplement E. Bylaws

Action required: Needs to be updated once Governance Structure and CEOS's role has been clarified. (prior to first election)

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Charter for the Geohazard Supersites Partnership

ARTICLE I – Name and objectives

Section 1.

395 The name of this partnership is the Geohazard Supersites Consortium. The main objective of the Geohazard Supersites Consortium is to facilitate and promote fundamental research activities that involve the use of SAR data and ground-based geophysical data such as GPS and seismic, and to develop an international cyber infrastructure for geohazard research.

Section 2.

400 The Geohazard Supersites operate initially as self-organizing Consortium of the Unavco Board of Directors. The affiliation with Unavco is temporary and a consequence of the Supersites initiative growing out of the WinSAR consortium. It is anticipated that the Supersites will eventually be attached to an international organization with equal representation of Asia/Oceania, Europe/Africa and the Americas. Then, the Bylaws will be amended accordingly. The amendments will be voted upon by the consortium members as designated in Article XIII section 1.

405

ARTICLE II – Member Institutions

Section 1.

Membership categories. There are two Membership categories, *Data User* and *Data Provider*. The Data Provider category includes the provider of satellite-based data and of in-situ data.

410

Section 2.

Membership. Data User Membership is open to research organizations with a legitimate scientific use of space borne Synthetic Aperture Radar (SAR) data, GPS and seismic data, and capable of abiding by the data use rules set forth by SAR data owners, data providers, and Geohazard Supersites sponsors. Data Provider Membership is open to any organization disseminate geophysical data for geohazard research (space-based or ground-based) to the Members. Membership is applied for by following the procedures and schedule established by the Scientific Advisory Committee of the Geohazard Supersites (Supersites SAC). Each new Member is approved by the Supersites SAC.

415

ARTICLE III – Member Representatives

Section 1.

420 Each member institution will select an institutional representative and the name of this representative will be transmitted to the chair of the Geohazard Supersites Advisory Committee (Supersites SAC)

Section 2.

Voting Rights. Each member representative shall have one vote.

425 **ARTICLE IV – Consortium Powers***Section 1.*

Composition: The Geohazard Supersites Consortium shall be composed of the institutional representatives designated in Article III, Section 1.

Section 2.

430 Powers: Full power in the management of the affairs of the Geohazard Supersites Consortium is vested in the membership. To this end and without limitation of the foregoing or of its powers expressly conferred by this charter, the Geohazard Supersites Consortium membership shall make policies for the Supersites initiative and create special committees as it shall deem best. The Geohazard Supersites Consortium shall have the power to fill vacancies in, and change the membership of, such committees as are constituted by it. In particular, 435 Geohazard Supersites membership will elect the elected members of the 6-member Scientific Advisory Committee (Supersites-SAC) every two years by recorded vote. The voting will be conducted by Unavco following established procedures.

Section 3.

440 Scientific Advisory Committee. The Supersites-SAC shall consist of six voting members elected by the Data User Membership, Out of the six Data User SAC members there shall be two representatives for each of the three regions: Europe/Africa, Asia/Oceania and Americas. Out of the two Data Provider SAC members there shall be one representative for the Satellite Data Providers and one representative for the Geological Surveys (representing the in-situ data providers). All members of the SAC shall be affiliated with institutional members of the Geohazard Supersites Consortium.

445 *Section 4.*

Ballots. Each Data User member shall receive a ballot with the names of the SAC candidates for each of the membership categories (taking into account the regional rule for Data User members) and for the SAC Chair, Vice-Chair and Secretary (for which the regional rule does not apply).

Section 5.

450 Chair, Vice-Chair and Secretary of the SAC. The candidates with the highest number of votes shall take these offices only if they are also elected as EC representatives. In the event that this is not the case the six Data User EC members shall elect the Chair, Vice Chair and Secretary.

Section 6.

455 Steering Group. The Steering Group consists of the Data Provider membership representing the Space Agencies and the Point-of-Contacts for each Supersite The representatives are named by the Data Provider members. The Steering Group shall elect one representative as the Vice Chair of the consortium.

Section 7.

460 Scientific Advisory Committee Powers: The Scientific Advisory Committee (Supersites-SAC) shall manage the affairs and business of the Geohazard Supersites consortium, and assure that operations conform to policy set by the membership. The Supersites-SAC shall have the authority to set operational goals.

Section 8.

Steering Group Powers: The Steering Group (Supersites-SG) provides the data as requested by the SAC. The Supersites-SG shall have the authority to set approve and decline data provision requests.

465 *Section 9.*

Term of Office of the Members of the SAC: The SAC members shall be elected for a term of two years until his/her successor is chosen. The term of office shall commence on January 1 of the year following such election and shall expire on December 31 of the second year of office. There will be no limit on the number of terms to which SAC members may be re- elected.

470 *Section 10.*

Alternative Members: Any representative may appoint an alternate member from the same institution. The alternate member shall replace the regular member in all of the activities for the specified time interval.

Section 11.

475 Chair: The Chair will call and conduct meetings of the Supersites-SAC. The Chair shall, when present, preside at all meetings, and shall perform such other duties and exercise such other powers as shall from time to time be assigned by the Supersites-SAC. The Chair shall have responsibility for the Supersites budget. The Chair may appoint advisory committees or panels to assist in carrying out the business of the Supersites initiative. The Chair oversees development and implementation of the plan for the Supersites. The Chair will maintain day-to-day oversight of Supersites activities. The Chair will conduct the annual meetings of the consortium members. The Chair is responsible for compiling annual reports of achievements and science investigations using Supersites data as required by sponsors and data providers.

480

The Chair shall be a member of Supersites-SAC and shall be elected by a majority of the Data User membership or by the Supersites SAC as designated in Article IV, section 5.

Section 12.

485 Vice-Chair: The Vice-Chairman shall preside, in the absence of the Chair, at all meetings of Supersites-SAC, and shall perform such other duties and exercise such other powers as shall from time to time be assigned by Supersites-SAC.

The Vice-Chair shall be a member of the Steering Group and shall be elected by a majority of the Steering Group members as designated in Article IV, section 6.

490 *Section 13.*

Secretary: The Secretary shall give notice of meetings of Supersites membership and Supersites-SAC, shall record all actions taken at such meetings and shall perform such other duties as shall from time to time be assigned by Supersites-C and Supersites-SAC.

495 The Secretary shall be a member of Supersites-SAC and shall be elected by a majority of the Data User membership or by the Supersites EC as designated in Article IV, section 5.

Section 14.

Election of members of the Executive Committee: The Executive Committee shall be elected by the Supersites-C by recorded ballot or email every two years immediately preceding the annual UNAVCO

500 meeting. Each institutional member of the Geohazard Supersites Consortium is responsible for nominating candidates for election.

Section 15.

505 Term of Office of the Members of the SAC: The SAC members shall be elected by Supersites-C for a term of two years or until his/her successor is chosen. The term of office shall commence on January 1 of the year following such election and shall expire on December 31 of the second year of office. There will be no limit on the number of terms to which SAC members may be re- elected.

Section 16.

Vacancies: Any vacancy in the SAC may be filled by majority vote of the remaining members of the Supersites-SAC. The term of the replacement SAC member will extend until the next Geohazard Supersites Consortium members meeting.

510 **ARTICLE V – Meetings of Geohazard Supersites Consortium and of the Supersites-SAC**

Section 1.

Bi-annual Meeting: The Geohazard Supersites Consortium shall hold at least one bi-annual meeting (every two years). The Supersites-SAC shall hold at least one semi-annual meeting at a time convenient for all of their members for the purpose of conducting Geohazard Supersites business.

515 *Section 2.*

Special Meetings: Special meetings of the Geohazard Supersites Consortium and Supersite-SAC may be called by the Chair at any time.

Section 3.

520 Place of Meetings: The Chair shall designate the place of the annual meeting or any special meeting and which shall be specified in the notice of meeting or waiver of notice thereof.

Section 4.

525 Notice of Meetings: Notice of such meeting of the Geohazard Supersites Consortium and the Supersites-SAC shall be given by the Chair, or by an officer directed by the Chair, to each Representative by delivering to him or her personally, or by first-class mail, or e-mail addressed to him or her at the address of his or her institution, a written or printed notice not less than ten nor more than sixty days before the date fixed for the meeting. Notice of any meeting need not be given to any representative, however, who submits a waiver of notice, whether before or after the meeting. The attendance of any representative at a meeting without protesting prior to the conclusion of the meeting, the lack of notice thereof shall constitute a waiver of notice by him or her. When a meeting is adjourned to another place or time, it shall not be necessary to give any notice of the adjourned meeting if the time and place to which the meeting is adjourned are announced at the meeting at which the adjournment is taken.

530 *Section 5.*

535 Quorum: Except as may be otherwise expressly required by this charter, at all meetings of the Geohazard Supersites Consortium or Supersites-SAC a one half quarter of the representatives or members of such committee shall constitute a quorum.

Section 6.

Geohazard Supersites meetings: The Geohazard Supersites Consortium and SAC may, at the direction of the Chair, meet in executive session. At such executive session, the meeting will be open only to members of Consortium or SAC and other persons specifically invited by the Chair.

540 *Section 7.*

Voting: Each Representative of the Geohazard Supersites Consortium shall be entitled to one vote at a Geohazard Supersites Consortium meeting. Except as otherwise expressly required by this charter, all matters shall be decided by the affirmative vote of a majority of votes cast, if a quorum is then present. Voting may be conducted by e-mail.

545 *Section 8.*

Action Without a Meeting: Any action required or permitted to be taken by the Geohazard Supersites Consortium or any committee thereof, may be taken without a meeting if a majority of members of Supersites-SAC consent in writing or by e-mail to the adoption of a resolution authorizing the action. The resolution and the written consents thereof shall be filed with the minutes of the proceedings of Geohazard Supersites Consortium or Supersites-SAC.

550 *Section 9.*

Participation by Conference Telephone: In any meeting of the Geohazard Supersites Consortium or any committee thereof, any one or more Representatives or members of any such committee may participate by means of a conference telephone or similar communications equipment allowing all persons participating in the meeting to hear each other at the same time. Participation by such means shall constitute presence in person at a meeting.

ARTICLE VI – Committees

555 *Section 1.*

Establishment of Committees: Committees of the Supersites initiative may be established for specified terms or without limit. Actions by the Geohazard Supersites Consortium or SAC to create Committees shall specify the scope of Committee activity. Committee members shall be appointed by the Chair of the Supersites-EC. Committees may not set policy or take binding action or publish documents without the consent of the Supersites-EC. Committees may not create or appoint Subcommittees without consent of the Supersites-EC.

ARTICLE VII – Method of Elections

565 *Section 1.*

Procedure: Officers will be elected by the Geohazard Supersites-Consortium in accordance with the procedures established in this charter.

570 *Section 2.*

Election: Election shall be by written ballot, which may be cast in person by a representative at the meeting, or may be submitted by mail, facsimile, or e-mail. Election shall be valid if ballots are received from one half of the members of the Geohazard Supersites Consortium in accordance with this Article.

575 *Section 2.*

Method of Voting: In the election of officers, a valid ballot shall contain at most one vote for each office; election shall be decided in favor of the nominee receiving a majority of votes representing a majority of the total membership of the Consortium.

Section 3.

Counting of Ballots: Ballots shall be counted by the Unavco Board liaison to the Supersites Initiative and the Chair of the Supersites-SAC.

ARTICLE VIII – Amendments

580 *Section 1.*

Amendments: The charter of the Geohazard Supersites Consortium shall be subject to amendment or repeal and a new charter may be made by the affirmative vote of two thirds of the entire Geohazard Supersites Consortium members at any annual or special meeting, the notice or waiver of notice of which shall have specified or

585

Supplement F. Issues to be resolved by the Scientific Advisory Committee

590 *Commercial companies.* It has been suggested that different Data User Membership applies for commercial companies and for research institutions. Suggestions include provisions that companies don't have voting rights and that Supersites data can be used only for research and development.

Civil Protection Authorities and Operational Data Use. It is not clear to what extent Civil Protection Authorities should be consortium members. Civil Protection Authorities could be commercial customer for some of the data providers.

595 *Geohazard monitoring obligations.* Several participating organizations have legal obligations in their home countries regarding geohazard monitoring. Data provision mechanisms may have to be adjusted for specific Supersites so that consortium participation does in no way interfere with these obligations.

600 *Best efforts.* The Geohazard Supersites is a voluntarily and best-effort initiative. This White Paper is in no way meant as a legally binding document. Any provisions in the bylaws to emphasize the voluntarily nature are encouraged. The bylaws in its current form have been derived from the bylaws of the WinSAR consortium.

Supplement G. History of White Paper draft

May 28-15 June 2010	version 1-5	Preliminary versions sent out for early comments
June 28, 2010	version FA1_0	Sent by GEO to data providers and the users
June 30, 2010	version FA1_1	Added sections to Appendix D. Appendix E added. Clarified role of NSF funding Unavco. Consistent use of "Supersites" instead of "Supersite"

Sep 6, 2010	version_FA2_0	Comments from Bergen meeting taking into account. Governance structure revised, Science Objectives and Data request added
Oct 20, 2010	version FA_3_0	Comments from some CEOS agencies taken into account. Separated into main document and supplement
Nov 29, 2010	version FA_3_1	Input from break-out session on Geohazard Supersites at 4 th ALOS-PI symposium, Tokyo, Nov 2010 incorporated.
April 9, 2011	version FA_3_2	Added to section 12.4 “Users of ground-based data originating from volcano observatories agree to give proper attribution and to refrain from making public predictions or forecasts of volcanic activity, pursuant to established international protocols (IAVCEI, 1999, Professional conduct during volcanic crises, Bull. Volcano. 60: 323-334).”

605

Supplement H. Detailed Data Request

Below are the PALSAR data requested for the three earthquake Supersites prior to the GEO plenary as listed in section 12.10. For some of the other data sets there are only limited online catalogue search tools and it is requested that the Space Agencies provide the listings. For an updated excel spreadsheet please visit the “Documents” section on the Supersite webpage (left vertical bar)

610

Dataset 5: PALSAR for Haiti earthquake

SceneID	date	Path
ALPSRP166373240	3/9/09	447
ALPSRP166373250	3/9/09	447
ALPSRP213343240	1/25/10	447
ALPSRP213343250	1/25/10	447
ALPSRP193580350	9/12/09	136
ALPSRP193580360	9/12/09	136
ALPSRP213710350	1/28/10	136
ALPSRP213710360	1/28/10	136
ALPSRP108830350	2/9/08	137
ALPSRP108830360	2/9/08	137
ALPSRP216190350	2/14/10	137
ALPSRP216190360	2/14/10	137
ALPSRP164990350	2/28/09	138
ALPSRP164990360	2/28/09	138
ALPSRP211960350	1/16/10	138
ALPSRP211960360	1/16/10	138

Dataset 6: PALSAR for Wenchuan earthquake

SceneID	date	Path
ALPSRP112550570	3/5/08	474

ALPSRP089210590	9/27/07	470	ALPSRP112550580	3/5/08	474
ALPSRP089210600	9/27/07	470	ALPSRP112550590	3/5/08	474
ALPSRP089210610	9/27/07	470	ALPSRP112550600	3/5/08	474
ALPSRP089210620	9/27/07	470	ALPSRP112550610	3/5/08	474
ALPSRP089210630	9/27/07	470	ALPSRP112550620	3/5/08	474
ALPSRP089210640	9/27/07	470	ALPSRP112550630	3/5/08	474
ALPSRP089210650	9/27/07	470	ALPSRP112550640	3/5/08	474
ALPSRP129470590	6/29/08	470	ALPSRP112550650	3/5/08	474
ALPSRP129470600	6/29/08	470	ALPSRP125970570	6/5/08	474
ALPSRP129470610	6/29/08	470	ALPSRP125970580	6/5/08	474
ALPSRP129470620	6/29/08	470	ALPSRP125970590	6/5/08	474
ALPSRP129470630	6/29/08	470	ALPSRP125970600	6/5/08	474
ALPSRP129470640	6/29/08	470	ALPSRP125970610	6/5/08	474
ALPSRP129470650	6/29/08	470	ALPSRP125970620	6/5/08	474
			ALPSRP125970630	6/5/08	474
ALPSRP111820570	2/29/08	471	ALPSRP125970640	6/5/08	474
ALPSRP111820580	2/29/08	471	ALPSRP125970650	6/5/08	474
ALPSRP111820590	2/29/08	471			
ALPSRP111820600	2/29/08	471	ALPSRP074770570	6/20/07	475
ALPSRP111820610	2/29/08	471	ALPSRP074770580	6/20/07	475
ALPSRP111820620	2/29/08	471	ALPSRP074770590	6/20/07	475
ALPSRP111820630	2/29/08	471	ALPSRP074770600	6/20/07	475
ALPSRP111820640	2/29/08	471	ALPSRP074770610	6/20/07	475
ALPSRP111820650	2/29/08	471	ALPSRP074770620	6/20/07	475
ALPSRP125240570	5/31/08	471	ALPSRP074770630	6/20/07	475
ALPSRP125240580	5/31/08	471	ALPSRP074770640	6/20/07	475
ALPSRP125240590	5/31/08	471	ALPSRP074770650	6/20/07	475
ALPSRP125240600	5/31/08	471	ALPSRP128450570	6/22/08	475
ALPSRP125240610	5/31/08	471	ALPSRP128450580	6/22/08	475
ALPSRP125240620	5/31/08	471	ALPSRP128450590	6/22/08	475
ALPSRP125240630	5/31/08	471	ALPSRP128450600	6/22/08	475
ALPSRP125240640	5/31/08	471	ALPSRP128450610	6/22/08	475
ALPSRP125240650	5/31/08	471	ALPSRP128450620	6/22/08	475
			ALPSRP128450630	6/22/08	475
ALPSRP053910570	1/28/07	472	ALPSRP128450640	6/22/08	475
ALPSRP053910580	1/28/07	472	ALPSRP128450650	6/22/08	475
ALPSRP053910590	1/28/07	472			
ALPSRP053910600	1/28/07	472	ALPSRP117510570	4/8/08	476
ALPSRP053910610	1/28/07	472	ALPSRP117510580	4/8/08	476
ALPSRP053910620	1/28/07	472	ALPSRP117510590	4/8/08	476
ALPSRP053910630	1/28/07	472	ALPSRP117510600	4/8/08	476
ALPSRP053910640	1/28/07	472	ALPSRP117510610	4/8/08	476
ALPSRP053910650	1/28/07	472	ALPSRP117510620	4/8/08	476
ALPSRP127720570	6/17/08	472	ALPSRP117510630	4/8/08	476
ALPSRP127720580	6/17/08	472	ALPSRP117510640	4/8/08	476
ALPSRP127720590	6/17/08	472	ALPSRP117510650	4/8/08	476
ALPSRP127720600	6/17/08	472	ALPSRP124220570	5/25/08	476
ALPSRP127720610	6/17/08	472	ALPSRP124220580	5/25/08	476

ALPSRP127720620	6/17/08	472	ALPSRP124220590	5/25/08	476
ALPSRP127720630	6/17/08	472	ALPSRP124220600	5/25/08	476
ALPSRP127720640	6/17/08	472	ALPSRP124220610	5/25/08	476
ALPSRP127720650	6/17/08	472	ALPSRP124220620	5/25/08	476
			ALPSRP124220630	5/25/08	476
ALPSRP110070570	2/17/08	473	ALPSRP124220640	5/25/08	476
ALPSRP110070580	2/17/08	473	ALPSRP124220650	5/25/08	476
ALPSRP110070590	2/17/08	473			
ALPSRP110070600	2/17/08	473	ALPSRP119990570	4/25/08	477
ALPSRP110070610	2/17/08	473	ALPSRP119990580	4/25/08	477
ALPSRP110070620	2/17/08	473	ALPSRP119990590	4/25/08	477
ALPSRP110070630	2/17/08	473	ALPSRP119990600	4/25/08	477
ALPSRP110070640	2/17/08	473	ALPSRP119990610	4/25/08	477
ALPSRP110070650	2/17/08	473	ALPSRP119990620	4/25/08	477
ALPSRP123490570	5/19/08	473	ALPSRP119990630	4/25/08	477
ALPSRP123490580	5/19/08	473	ALPSRP119990640	4/25/08	477
ALPSRP123490590	5/19/08	473	ALPSRP119990650	4/25/08	477
ALPSRP123490600	5/19/08	473	ALPSRP126700570	6/10/08	477
ALPSRP123490610	5/19/08	473	ALPSRP126700580	6/10/08	477
ALPSRP123490620	5/19/08	473	ALPSRP126700590	6/10/08	477
ALPSRP123490630	5/19/08	473	ALPSRP126700600	6/10/08	477
ALPSRP123490640	5/19/08	473	ALPSRP126700610	6/10/08	477
ALPSRP123490650	5/19/08	473	ALPSRP126700620	6/10/08	477
			ALPSRP126700630	6/10/08	477
ALPSRS103432950	1/3/08	124	ALPSRP126700640	6/10/08	477
ALPSRS103433000	1/3/08	124	ALPSRP126700650	6/10/08	477
ALPSRS123562950	5/20/08	124			
ALPSRS123563000	5/20/08	124			

Dataset 7: PALSAR for Chile earthquake

SceneID	date	Path			
ALPSRP091326440	10/12/07	111	ALPSRP215316390	2/8/10	115
ALPSRP091326450	10/12/07	111	ALPSRP215316400	2/8/10	115
ALPSRP091326460	10/12/07	111	ALPSRP215316410	2/8/10	115
ALPSRP091326470	10/12/07	111	ALPSRP215316420	2/8/10	115
ALPSRP091326480	10/12/07	111	ALPSRP215316430	2/8/10	115
ALPSRP091326490	10/12/07	111	ALPSRP215316440	2/8/10	115
ALPSRP091326500	10/12/07	111	ALPSRP215316450	2/8/10	115
ALPSRP091326510	10/12/07	111	ALPSRP215316460	2/8/10	115
ALPSRP091326520	10/12/07	111	ALPSRP215316470	2/8/10	115
ALPSRP218816440	3/4/10	111	ALPSRP222026390	3/26/10	115
ALPSRP218816450	3/4/10	111	ALPSRP222026400	3/26/10	115
ALPSRP218816460	3/4/10	111	ALPSRP222026410	3/26/10	115
ALPSRP218816470	3/4/10	111	ALPSRP222026420	3/26/10	115
ALPSRP218816480	3/4/10	111	ALPSRP222026430	3/26/10	115
ALPSRP218816490	3/4/10	111	ALPSRP222026440	3/26/10	115
ALPSRP218816500	3/4/10	111	ALPSRP222026450	3/26/10	115
ALPSRP218816510	3/4/10	111	ALPSRP222026460	3/26/10	115
ALPSRP218816520	3/4/10	111	ALPSRP222026470	3/26/10	115

ALPSRP214586390	2/3/10	112	ALPSRP217796390	2/25/10	116
ALPSRP214586400	2/3/10	112	ALPSRP217796400	2/25/10	116
ALPSRP214586410	2/3/10	112	ALPSRP217796410	2/25/10	116
ALPSRP214586420	2/3/10	112	ALPSRP217796420	2/25/10	116
ALPSRP214586430	2/3/10	112	ALPSRP217796430	2/25/10	116
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ALPSRP214586450	2/3/10	112	ALPSRP217796450	2/25/10	116
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ALPSRP214586480	2/3/10	112	ALPSRP224506400	4/12/10	116
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ALPSRP214586500	2/3/10	112	ALPSRP224506420	4/12/10	116
ALPSRP214586510	2/3/10	112	ALPSRP224506430	4/12/10	116
ALPSRP214586520	2/3/10	112	ALPSRP224506440	4/12/10	116
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ALPSRP221296400	3/21/10	112	ALPSRP224506460	4/12/10	116
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ALPSRP221296420	3/21/10	112	ALPSRP166596410	3/11/09	117
ALPSRP221296430	3/21/10	112	ALPSRP166596420	3/11/09	117
ALPSRP221296440	3/21/10	112	ALPSRP166596430	3/11/09	117
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ALPSRP221296480	3/21/10	112	ALPSRP220276430	3/14/10	117
ALPSRP221296490	3/21/10	112	ALPSRP220276440	3/14/10	117
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ALPSRP221296510	3/21/10	112	ALPSRP216046390	2/13/10	118
ALPSRP221296520	3/21/10	112	ALPSRP216046400	2/13/10	118
			ALPSRP216046410	2/13/10	118
ALPSRP109706400	2/15/08	113	ALPSRP216046420	2/13/10	118
ALPSRP109706410	2/15/08	113	ALPSRP216046430	2/13/10	118
ALPSRP109706420	2/15/08	113	ALPSRP222756390	3/31/10	118
ALPSRP109706430	2/15/08	113	ALPSRP222756400	3/31/10	118
ALPSRP109706440	2/15/08	113	ALPSRP222756410	3/31/10	118
ALPSRP109706450	2/15/08	113	ALPSRP222756420	3/31/10	118
ALPSRP109706460	2/15/08	113	ALPSRP222756430	3/31/10	118
ALPSRP109706470	2/15/08	113			
ALPSRP109706480	2/15/08	113	ALPSRP211816390	1/15/10	119
ALPSRP109706490	2/15/08	113	ALPSRP211816400	1/15/10	119
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ALPSRP223776410	4/7/10	113	ALPSRP218526390	3/2/10	119
ALPSRP223776420	4/7/10	113	ALPSRP218526400	3/2/10	119
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ALPSRP223776440	4/7/10	113	ALPSRP218526420	3/2/10	119
ALPSRP223776450	4/7/10	113	ALPSRP218526430	3/2/10	119

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			ALPSRP092704380	10/21/07	420
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ALPSRP165866480	3/6/09	114			
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ALPSRP219546390	3/9/10	114	ALPSRP211734270	1/14/10	422
ALPSRP219546400	3/9/10	114	ALPSRP211734280	1/14/10	422
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ALPSRP219546420	3/9/10	114	ALPSRP211734300	1/14/10	422
ALPSRP219546430	3/9/10	114	ALPSRP211734310	1/14/10	422
ALPSRP219546440	3/9/10	114	ALPSRP211734320	1/14/10	422
ALPSRP219546450	3/9/10	114	ALPSRP211734330	1/14/10	422
ALPSRP219546460	3/9/10	114	ALPSRP211734340	1/14/10	422
ALPSRP219546470	3/9/10	114	ALPSRP211734350	1/14/10	422
ALPSRP219546480	3/9/10	114	ALPSRP211734360	1/14/10	422
ALPSRP219546490	3/9/10	114	ALPSRP211734370	1/14/10	422
			ALPSRP211734380	1/14/10	422
			ALPSRP211734390	1/14/10	422
			ALPSRP211734400	1/14/10	422
			ALPSRS117794350	4/10/08	422
			ALPSRS117794400	4/10/08	422
			ALPSRS218444350	3/1/10	422
			ALPSRS218444400	3/1/10	422