# The QuakeTables UAVSAR Repository – Delivering RPI Products to Geo-Science Applications

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## Introduction

In recent years, the geo-science community has expanded its need for spaceborne data to study the Earth and its deformations. QuakeTables, the ontology-based federated database system, expanded its radar-based data repository from only housing InSAR interferograms to also include Repeat Pass Interferometry (RPI) products for Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR).

Each RPI product is cataloged within QuakeTables using its metadata and the collection of products available in the RPI release for that specific pass, allowing users to access all related data files and annotations. Further, QuakeTables provides visualization utilizing multiple levels of resolution via Google Maps and Google Earth. As illustrated by the recent earthquake in Japan, there is an urgent need for scientific data after a natural disaster and the interferograms generated from an easily deployable UAVSAR flight can help scientists and first responders study the deformation on the Earth's surface and act accordingly.

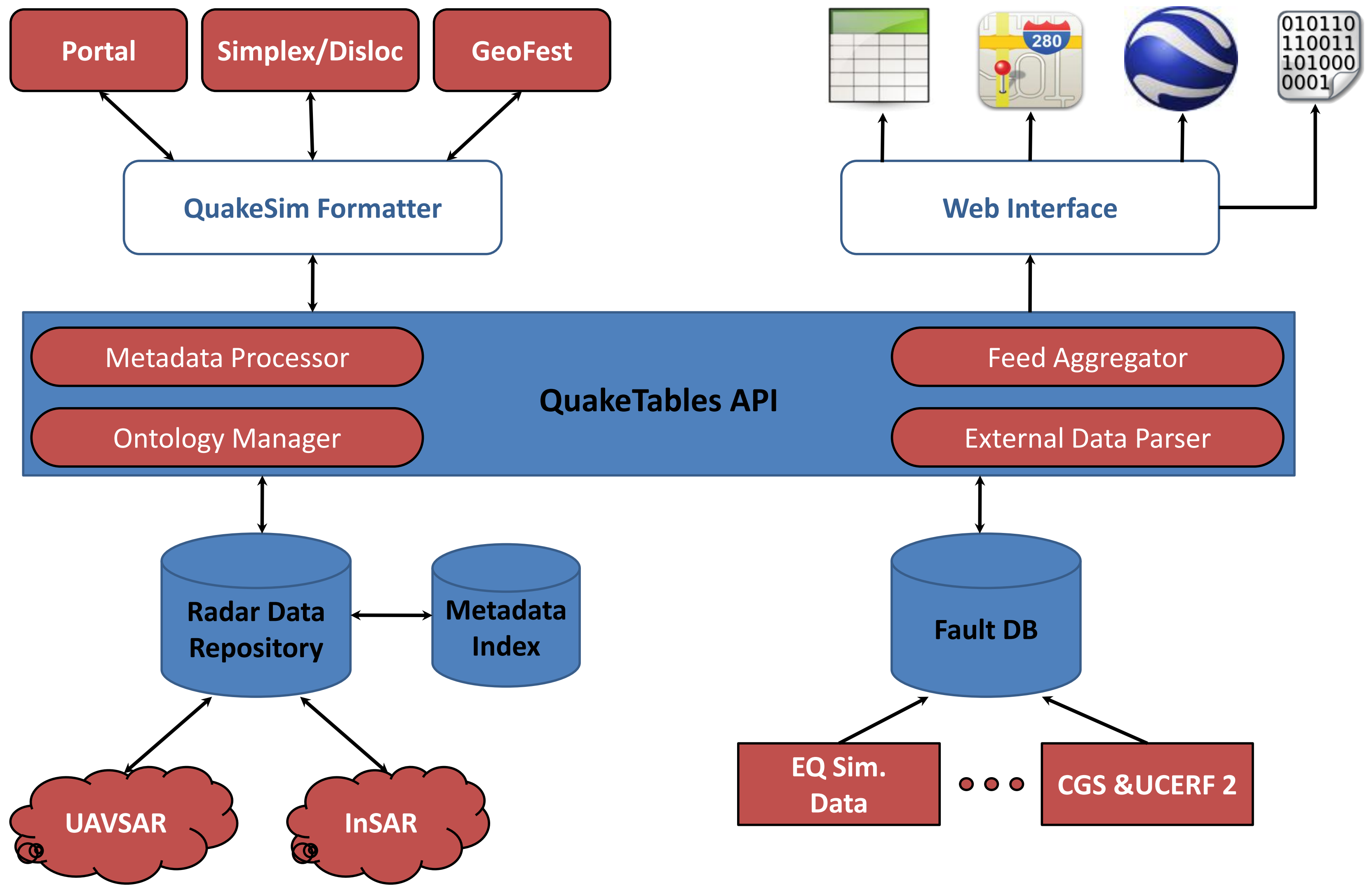
The QuakeTables infrastructure assures a speedy deployment of such products as soon as they are available. UAVSAR RPI products are constantly being added to the repository as they are released by the JPL UAVSAR group. QuakeTables provides access to both its fault-based and radar-based datasets via a web interface, an API and a webservices interface. The UAVSAR data repository was developed by the QuakeSim group on USC and IU facilities and with the goal of transferring the capabilities to the Alaska Satellite Facility UAVSAR Distributed Active Archive Center (DAAC).

## QuakeTables Architecture

In QuakeTables, we provide federated access to a plethora of data sets spanning many data types producing custom representations of the data housed-in or indexed by QuakeTables. From an abstract point of view, the QuakeTables domain ontology manages radar and fault data.

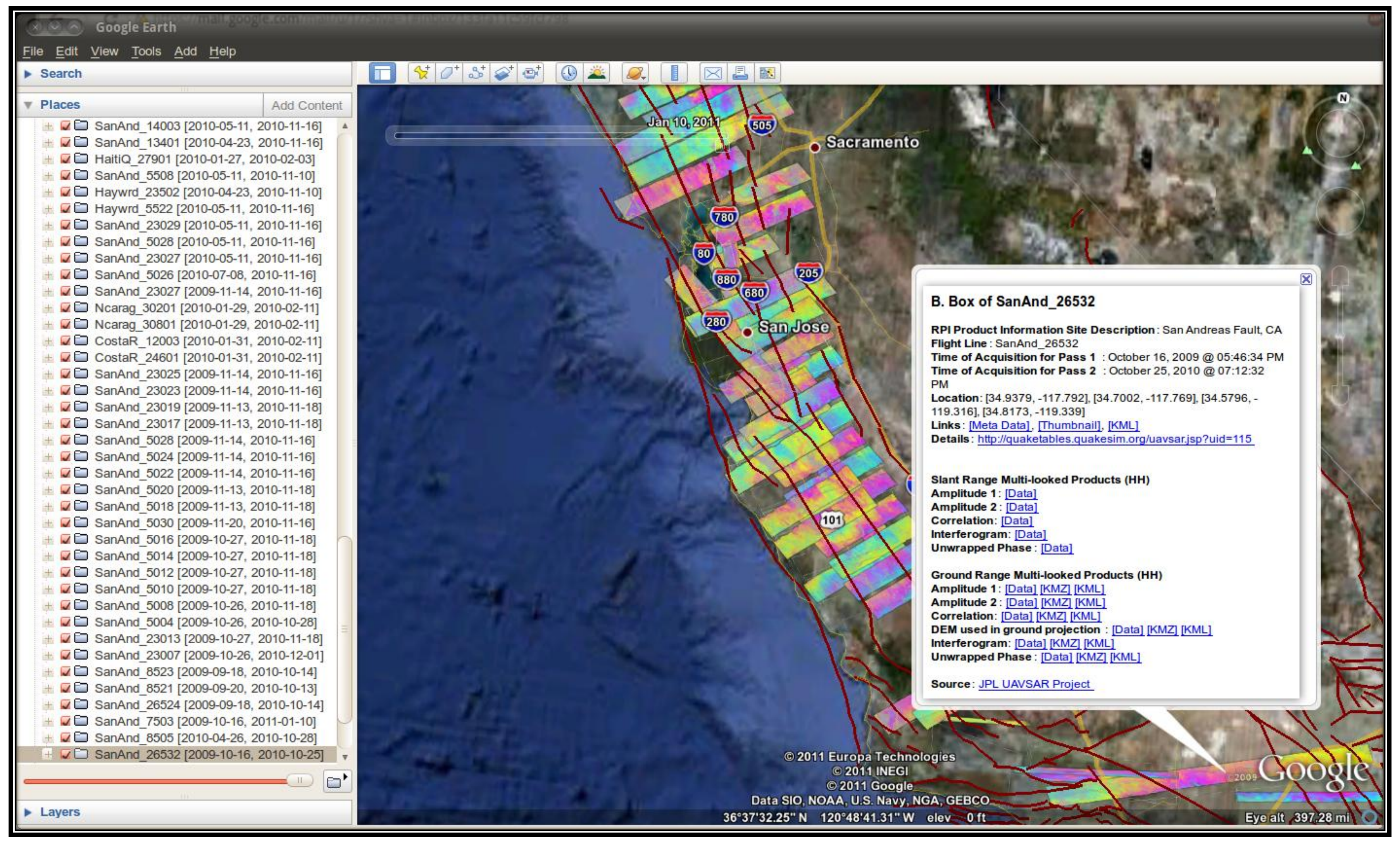
The users in QuakeTables interact with the system via the web interface or directly via the API. Both methods of interaction provide unfettered access to the complete system.

Recent expansions to the QuakeTables infrastructure will ensure its reliability and expand its capability to incorporate more datasets.



*QuakeTables Architecture*

## Visualizing UAVSAR in QuakeTables


Google Earth
File Edit View Tools Add Help
Search
Places
Add Content
Layers
Sacramento
San Jose
© 2011 Europa Technologies
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
36°37'32.25" N 120°48'41.31" W elev 0 ft
Eye alt 397.28 mi
Google

SanAnd_14003 [2010-05-11, 2010-11-16]
SanAnd_13401 [2010-04-23, 2010-11-16]
HaitiQ_27901 [2010-01-27, 2010-02-03]
SanAnd_5508 [2010-05-11, 2010-11-10]
Haywrd_23502 [2010-04-23, 2010-11-10]
Haywrd_5522 [2010-05-11, 2010-11-16]
SanAnd_23029 [2010-05-11, 2010-11-16]
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SanAnd_5012 [2009-10-27, 2010-11-18]
SanAnd_5010 [2009-10-27, 2010-11-18]
SanAnd_5008 [2009-10-26, 2010-11-18]
SanAnd_5004 [2009-10-26, 2010-10-28]
SanAnd_23013 [2009-10-27, 2010-11-18]
SanAnd_23007 [2009-10-26, 2010-12-01]
SanAnd_8523 [2009-09-18, 2010-10-14]
SanAnd_8521 [2009-09-20, 2010-10-13]
SanAnd_26524 [2009-09-18, 2010-10-14]
SanAnd_7503 [2009-10-16, 2011-01-10]
SanAnd_8505 [2010-04-26, 2010-10-28]
SanAnd_26532 [2009-10-16, 2010-10-25]

**B. Box of SanAnd_26532**

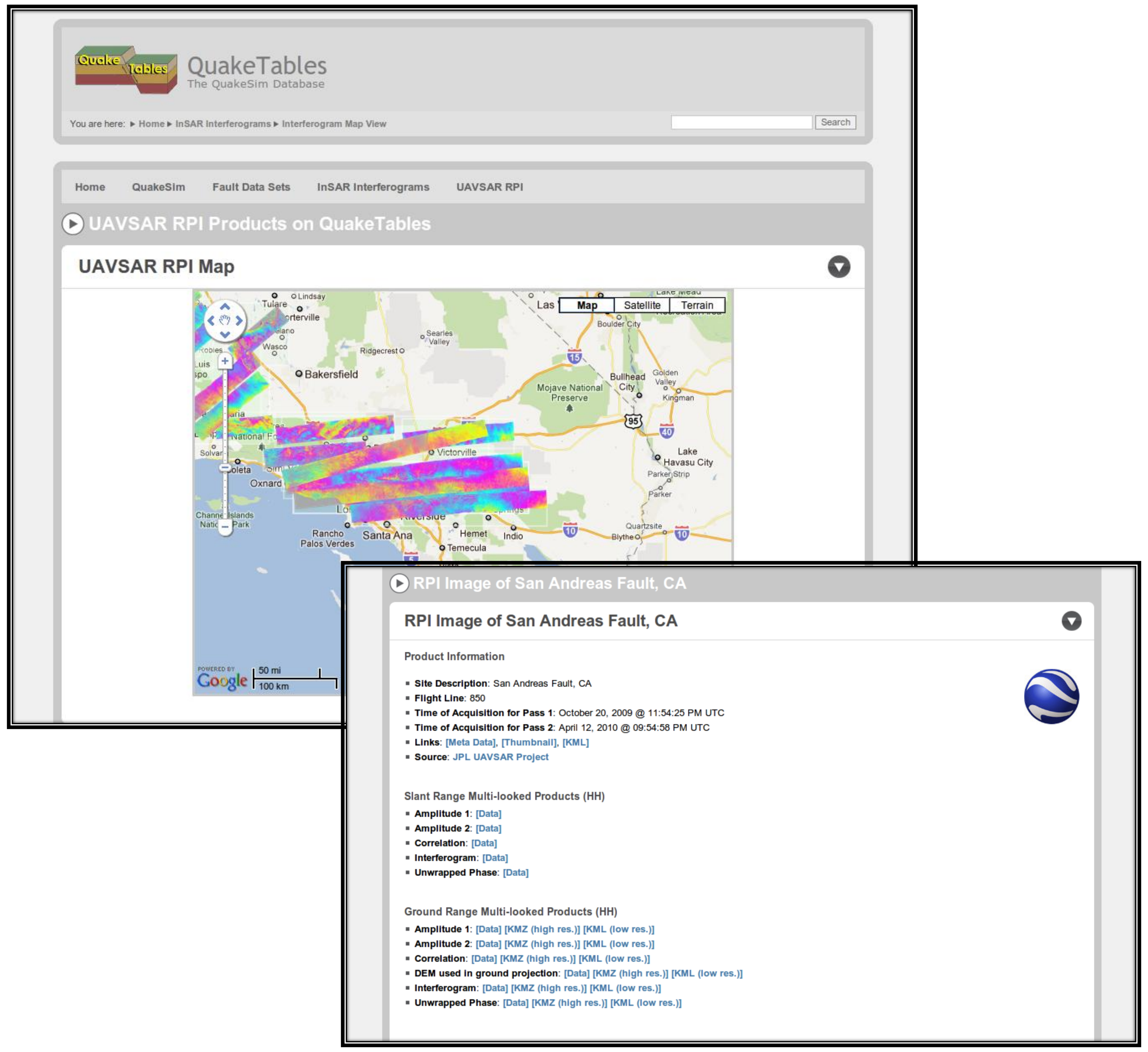
**RPI Product Information Site Description**: San Andreas Fault, CA
**Flight Line**: SanAnd_26532
**Time of Acquisition for Pass 1** : October 16, 2009 @ 05:46:34 PM
**Time of Acquisition for Pass 2** : October 25, 2010 @ 07:12:32 PM
**Location**: [34.9379, -117.792], [34.7002, -117.769], [34.5796, -119.316], [34.8173, -119.339]
**Links**: [Meta Data], [Thumbnail], [KML]
**Details**: http://quaketables.quakesim.org/uavsar.jsp?uid=115

**Slant Range Multi-looked Products (HH)**
**Amplitude 1**: [Data]
**Amplitude 2**: [Data]
**Correlation**: [Data]
**Interferogram**: [Data]
**Unwrapped Phase**: [Data]

**Ground Range Multi-looked Products (HH)**
**Amplitude 1**: [Data] [KMZ] [KML]
**Amplitude 2**: [Data] [KMZ] [KML]
**Correlation**: [Data] [KMZ] [KML]
**DEM used in ground projection** : [Data] [KMZ] [KML]
**Interferogram**: [Data] [KMZ] [KML]
**Unwrapped Phase**: [Data] [KMZ] [KML]

**Source**: JPL UAVSAR Project

*UAVSAR Animation on Google Earth overlaid on UCERF 2 Faults from QuakeTables*



You are here: ▸ Home ▸ InSAR Interferograms ▸ Interferogram Map View

UAVSAR RPI Products on QuakeTables

UAVSAR RPI Map

RPI Image of San Andreas Fault, CA

RPI Image of San Andreas Fault, CA

Product Information

- **Site Description**: San Andreas Fault, CA
- **Flight Line**: 850
- **Time of Acquisition for Pass 1**: October 20, 2009 @ 11:54:25 PM UTC
- **Time of Acquisition for Pass 2**: April 12, 2010 @ 09:54:58 PM UTC
- **Links**: [Meta Data], [Thumbnail], [KML]
- **Source**: JPL UAVSAR Project

Slant Range Multi-looked Products (HH)

- **Amplitude 1**: [Data]
- **Amplitude 2**: [Data]
- **Correlation**: [Data]
- **Interferogram**: [Data]
- **Unwrapped Phase**: [Data]

Ground Range Multi-looked Products (HH)

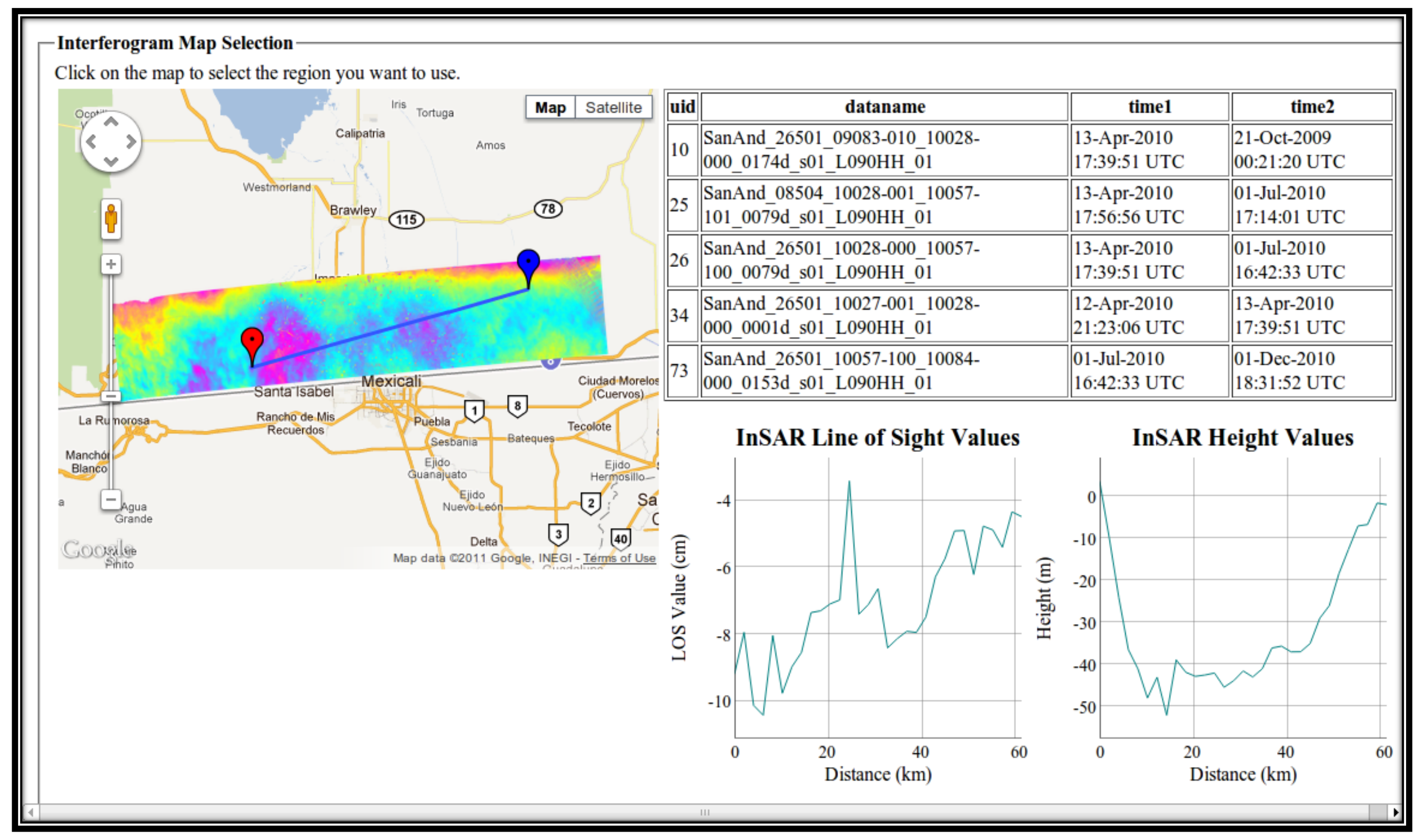
- **Amplitude 1**: [Data] [KMZ (high res.)] [KML (low res.)]
- **Amplitude 2**: [Data] [KMZ (high res.)] [KML (low res.)]
- **Correlation**: [Data] [KMZ (high res.)] [KML (low res.)]
- **DEM used in ground projection**: [Data] [KMZ (high res.)] [KML (low res.)]
- **Interferogram**: [Data] [KMZ (high res.)] [KML (low res.)]
- **Unwrapped Phase**: [Data] [KMZ (high res.)] [KML (low res.)]

*Accessing UAVSAR Product Information from the QuakeTables Website*

## Science Application – Line of Sight (LOS) Tool

The Synthetic Aperture Radar Line of Sight (SAR-LOS) tool is one of the early science applications that utilizes the QuakeTables UAVSAR repository. SAR-LOS users could calculate the displacement of a segment in the direction of the line of sight. Furthermore, the tool uses the Digital Elevation Map (DEM) provided by QuakeTables to show the displacement in terrain heights.

http://links.quakesim.org/sar-los



**Interferogram Map Selection**

Click on the map to select the region you want to use.

| uid | dataname | time1 | time2 |
|---|---|---|---|
| 10 | SanAnd_26501_09083-010_10028-000_0174d_s01_L090HH_01 | 13-Apr-2010 17:39:51 UTC | 21-Oct-2009 00:21:20 UTC |
| 25 | SanAnd_08504_10028-001_10057-101_0079d_s01_L090HH_01 | 13-Apr-2010 17:56:56 UTC | 01-Jul-2010 17:14:01 UTC |
| 26 | SanAnd_26501_10028-000_10057-100_0079d_s01_L090HH_01 | 13-Apr-2010 17:39:51 UTC | 01-Jul-2010 16:42:33 UTC |
| 34 | SanAnd_26501_10027-001_10028-000_0001d_s01_L090HH_01 | 12-Apr-2010 21:23:06 UTC | 13-Apr-2010 17:39:51 UTC |
| 73 | SanAnd_26501_10057-100_10084-000_0153d_s01_L090HH_01 | 01-Jul-2010 16:42:33 UTC | 01-Dec-2010 18:31:52 UTC |

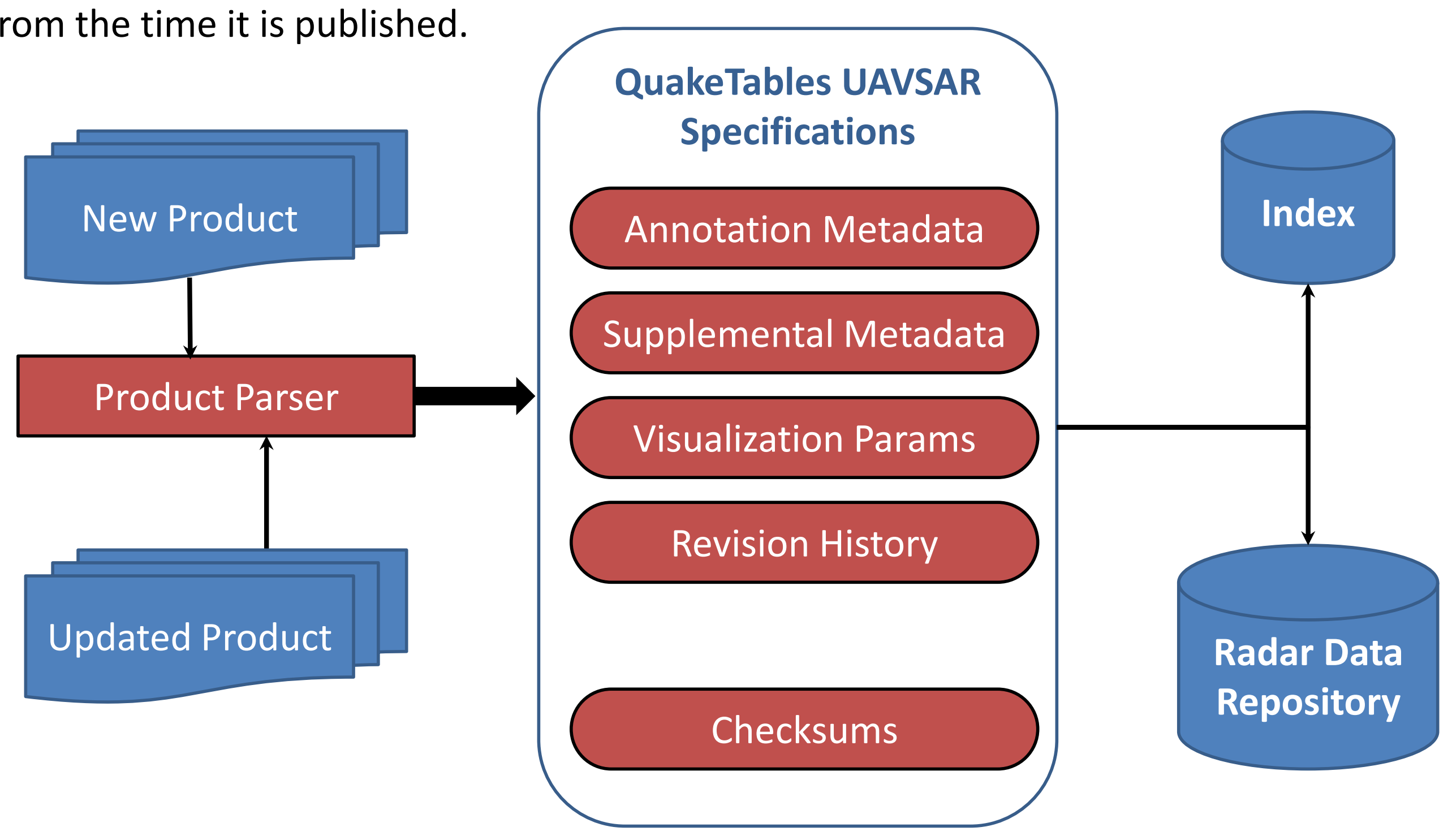
*SAR-LOS Uses UAVSAR from QuakeTables to Generate its Results*

## UAVSAR Products

QuakeTables updates its repositories with new and revised products on a daily bases. Currently, we have 225 RPI UAVSAR products populating around 2TB of data. Data products are published by the JPL UAVSAR project:

http://uavsar.jpl.nasa.gov/

Upon receiving a new product, QuakeTables downloads the processed data, analyzes the metadata and creates supplemental data to support indexing, visualization. The turn around time of including a new product is 12 hours from the time it is published.



*UAVSAR Product Processing*

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