Overview of UAVSAR Project Status

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UAVSAR Workshop
Mountain View, CA
October 16, 2015

Outline

- Instrument Suite Overview
- L-band Radar Flight Statistics
- FY15 Science Campaign Highlights
- FY15 Science Highlights
- P-band (AirMOSS) and Ka-band (GLISTIN-A) Radar Status
- FY15 Flight Calendar and Opportunities

UAVSAR Instrument Suite

P/L/Ka-band radars SHARE COMMON HARDWARE, GROUND DATA SYSTEM, AND TRAINED STAFF

- *Currently L-band is a facility instrument, i.e. PIs pay for only aircraft flight hour cost*
- *AirMOSS (P-band) and GLISTIN (Ka-band): PIs pay for aircraft flight hours and JPL radar support*

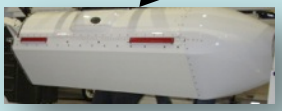
FLIGHT PLANNING

Choose frequency in Flight Planning Tool
And SOFRS (NASA flight request interface)

INSTRUMENT

Back-end electronics (3 sets) and spares common to all frequencies

L-band



P-band

Ka-band

FLIGHT AND PROCESSOR OPERATIONS

Common Flight Operations

Ground Data System

Perform SAR processing at Ames' Pleiades supercomputing facility

DATA DISTRIBUTION AND ARCHIVE

Alaska Satellite Facility and JPL Website

UAVSAR Instrument Parameters

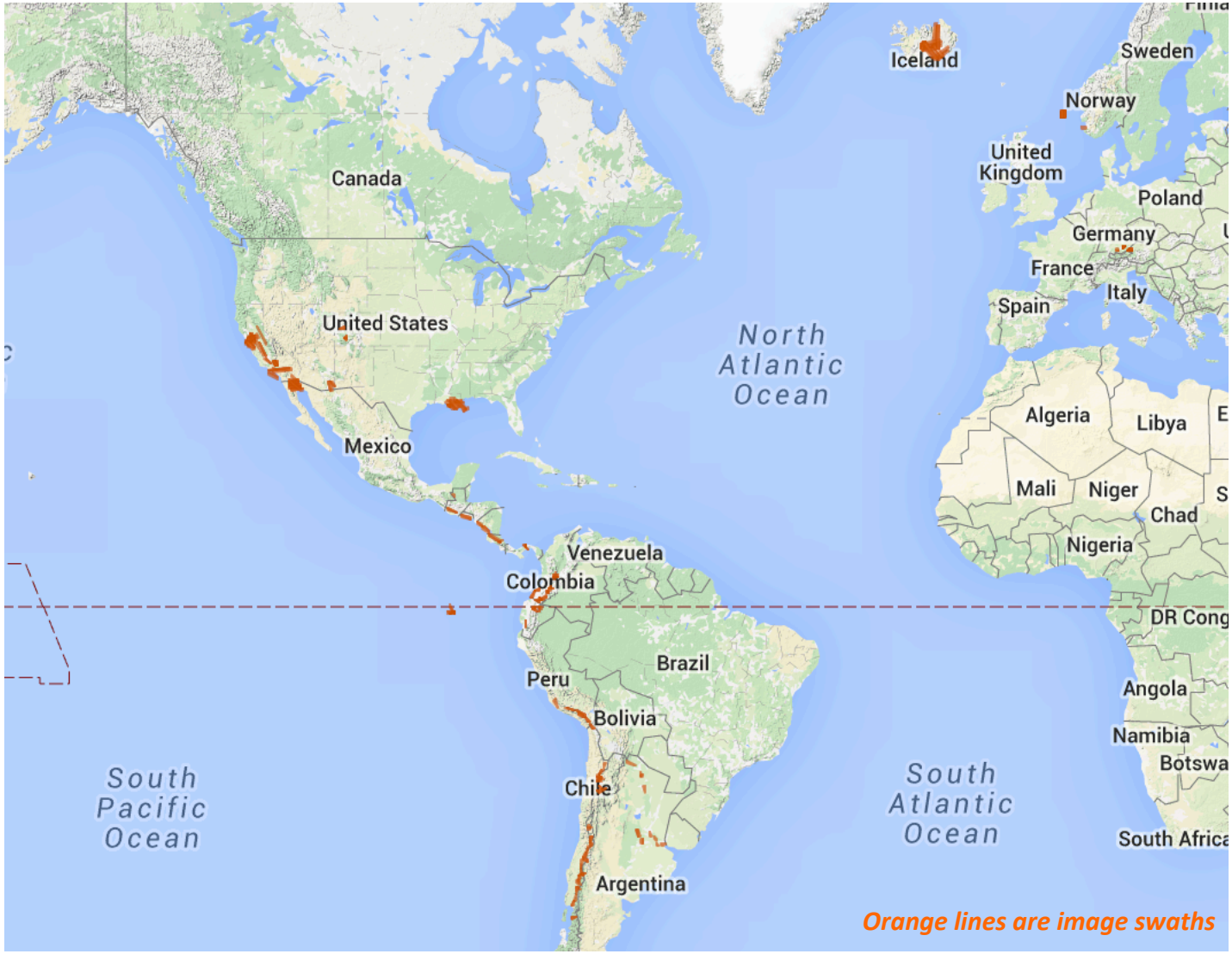
	P-band/UHF	L-band	Ka-band
Frequency (MHz)	280 – 440	1217.5-1297.5	35,620-35,700
Nominal Bandwidth (MHz)	20	80	80
Selectable Bandwidths (MHz)	6, 20, 40, 80	80	80
Polarization	Quad-pol	Quad-pol	Horizontal
Peak Transmit Power (kW)	2.0	3.1	0.8
Maximum Duty Cycle	10%	8%	10%
Look Angle Range	25 – 50 deg	25-65 deg	15-50
Nominal Range Swath (km)	9	22	10
Noise Equivalent Sigma0 (dB)	< -40	< -50	TBD
Radiometric Accuracy (dB)	< 1 absolute	< 1 absolute	TBD
Height Precision (30x30 m posting)	N/A	N/A	0.1 – 0.5 m

L-band SAR: Data Coverage and 2015 Science Highlights

UAVSAR L-band Flight Statistics

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Flights	65	84	86	76	87	68	51
Flight Hours	350	447	396	433	593	431	386
Flight Lines	**649**	**925**	**735**	**764**	**867**	**688**	**514**
Raw Data Volume (GB)	18,731	22,811	19,597	19,402	17,024	16,895	11,253
Flight Requests	23	30	27	19	28	25	23

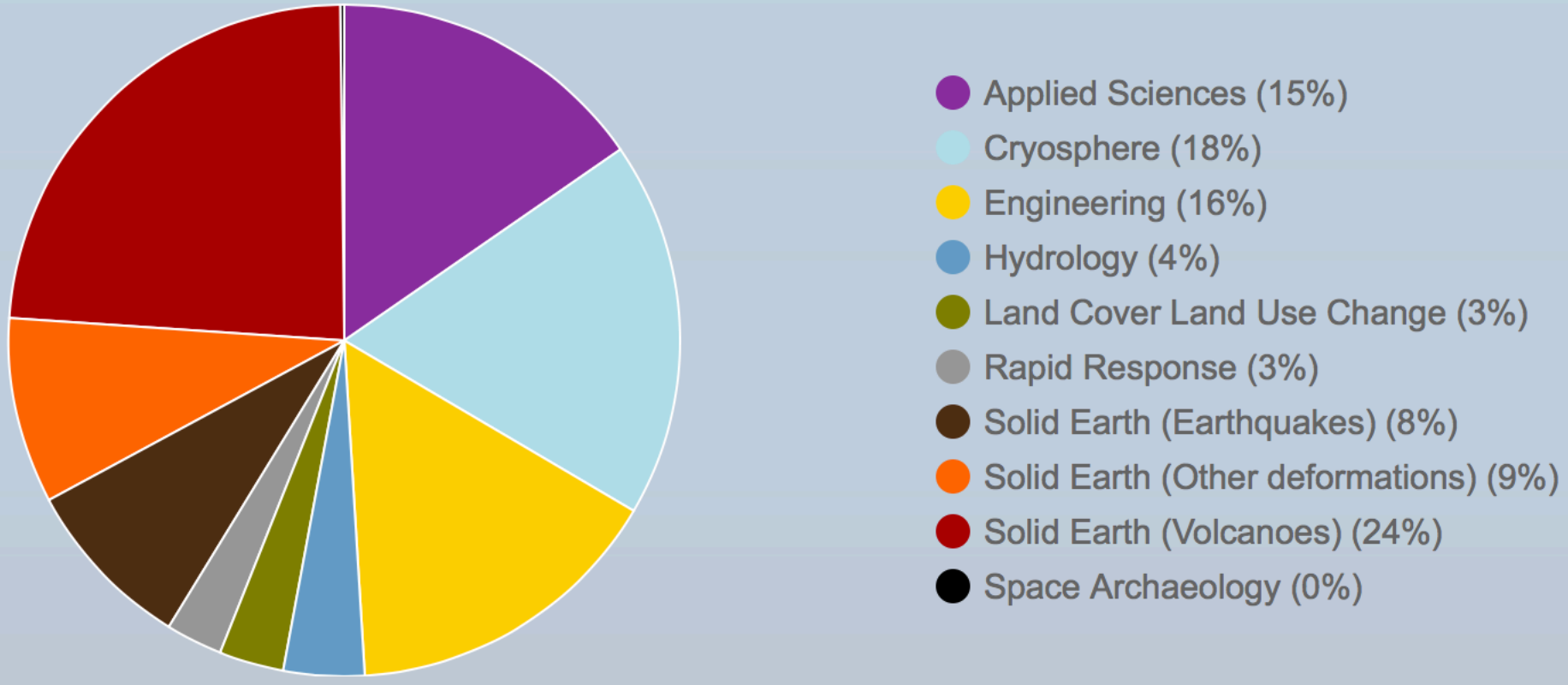
FY15 Data Acquisitions



Major deployments: Iceland, Norway, Germany, Central/South America

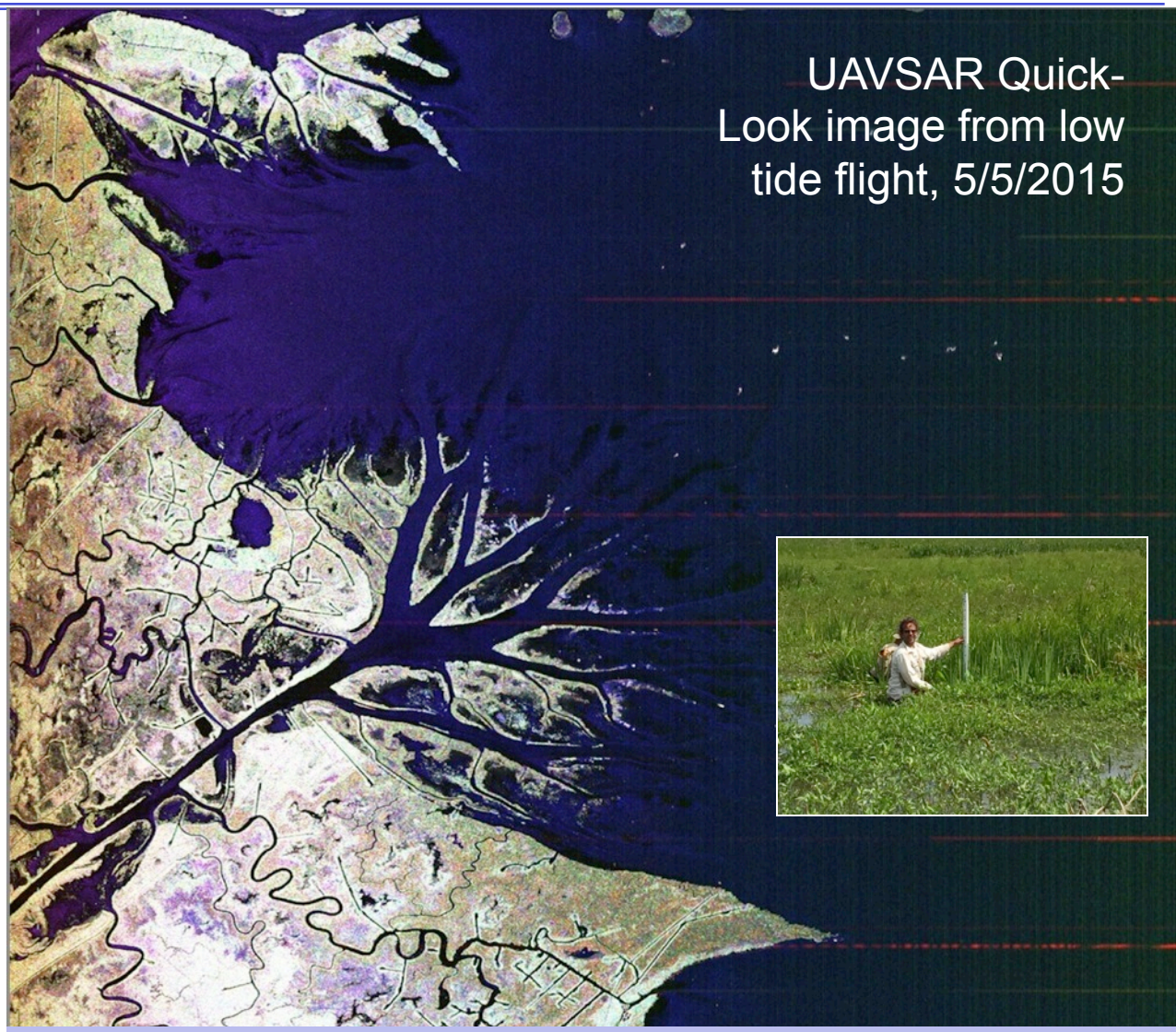
Data Acquisitions in FY15

- 386 flight hours between 10/1/2014 – 9/30/2015



UAVSAR Wax Lake Delta, Louisiana Deployment: May 5-11, 2015

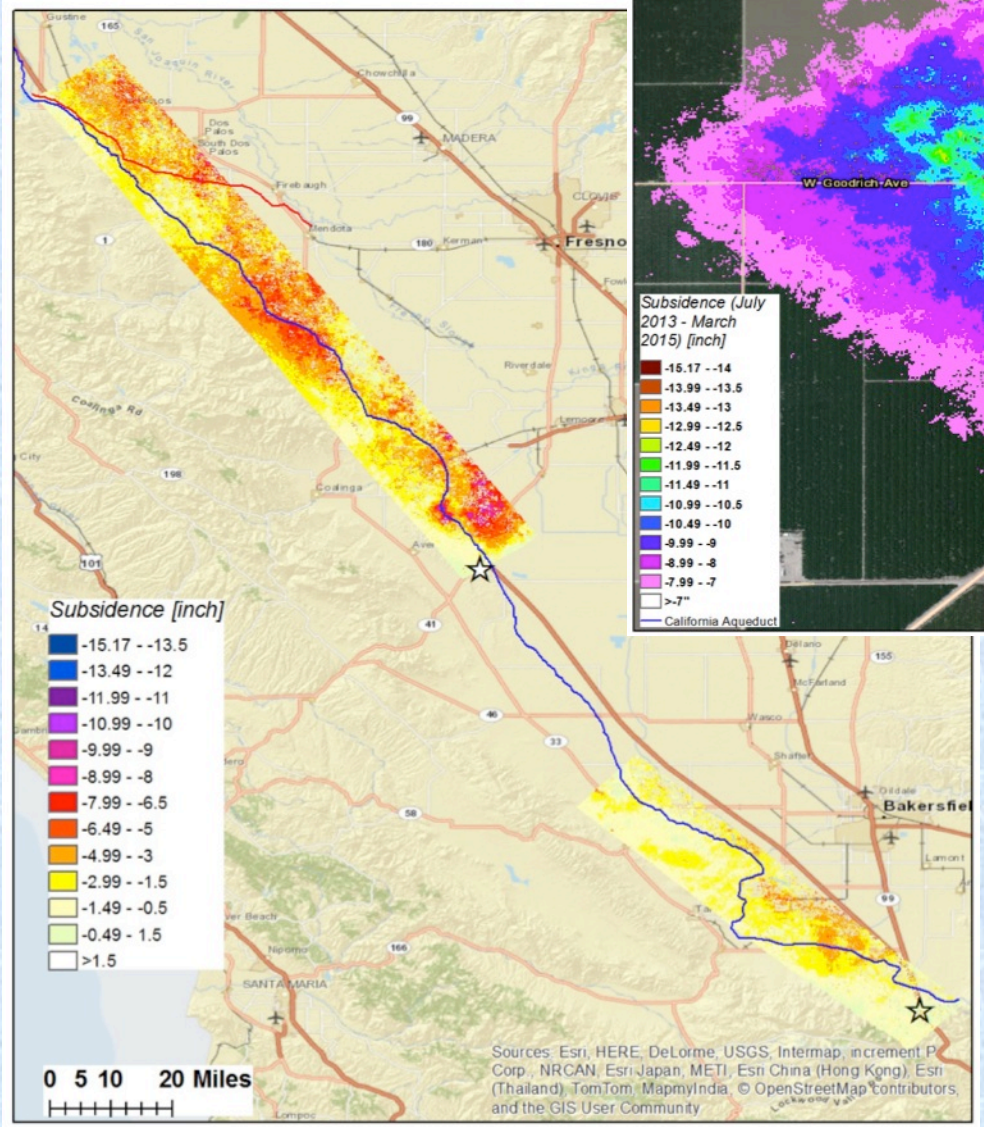
- Combined AirSWOT, UAVSAR, and AVIRIS-NG
- Study sediment transport in a naturally evolving delta and in coastal wetlands
- Intensive concurrent field campaigns to provide ground validation (water level and quality, and biomass)
- AirSWOT used to determine water surface elevation & currents in channels and coastal waters
- UAVSAR used for water elevation change, shallow coastal bathymetry, water extent, vegetation biomass
- UAVSAR/AirSWOT cross-calibration for water level change in wetlands
- AVIRIS-NG acquisitions to accurately map vegetation species distributions and biomass, and provide information on water quality.

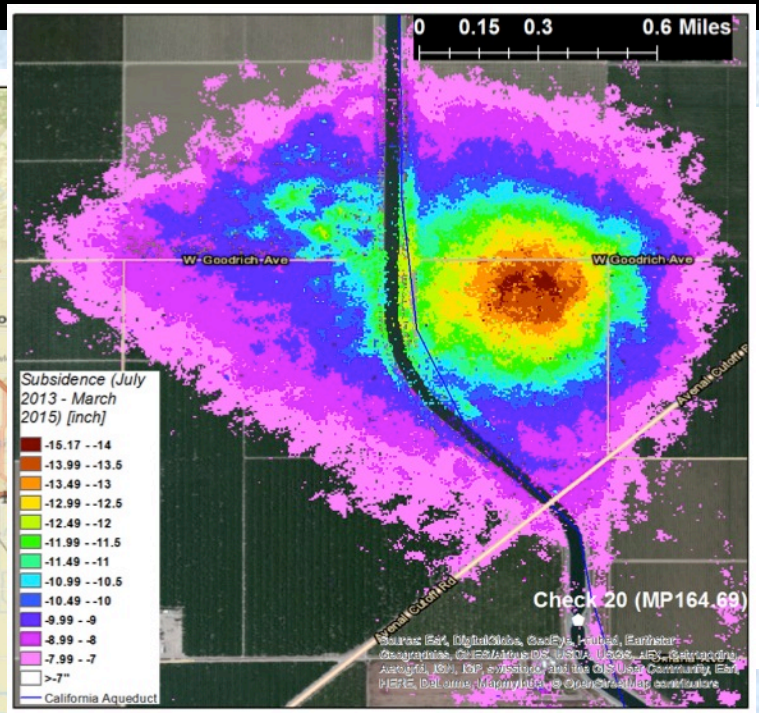


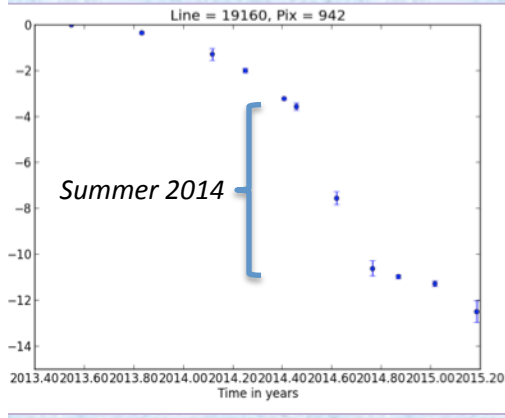
Collaboration: JPL, Caltech, UT-Austin, LSU, Rice U., Indiana U., U. Miami, U. Colorado, U. Rouen/France

California Drought: Effect of Groundwater Pumping on the California Aqueduct

JPL





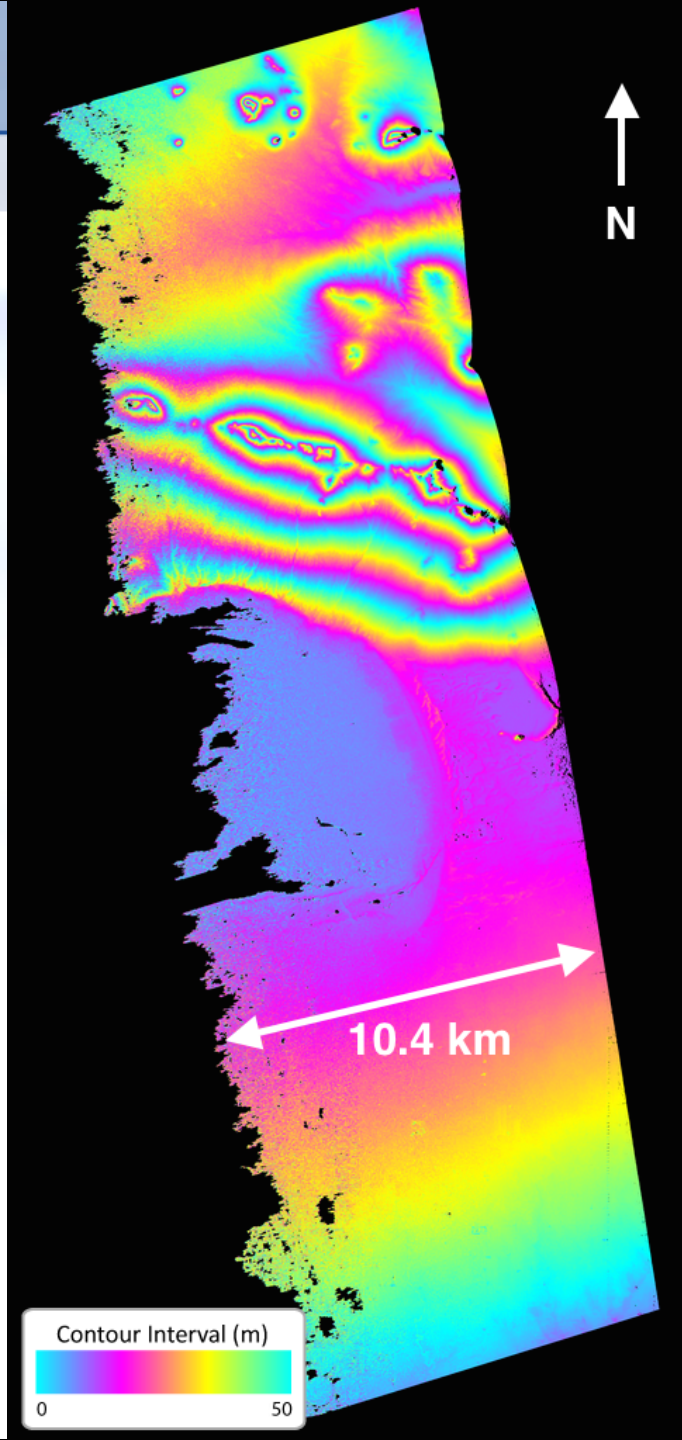


- Groundwater pumping increased dramatically in 3rd year of CA drought
- Subsidence directly impacting the Ca. Aqueduct of >7" occurred along a 1.3 mile stretch.
- Ca. Dept. of Water Resources is using this information to develop policy & monitoring / operations.

Analysis by C. Jones, from Progress Report: Subsidence in the Central Valley, California (Farr, Jones, Liu, 2015)

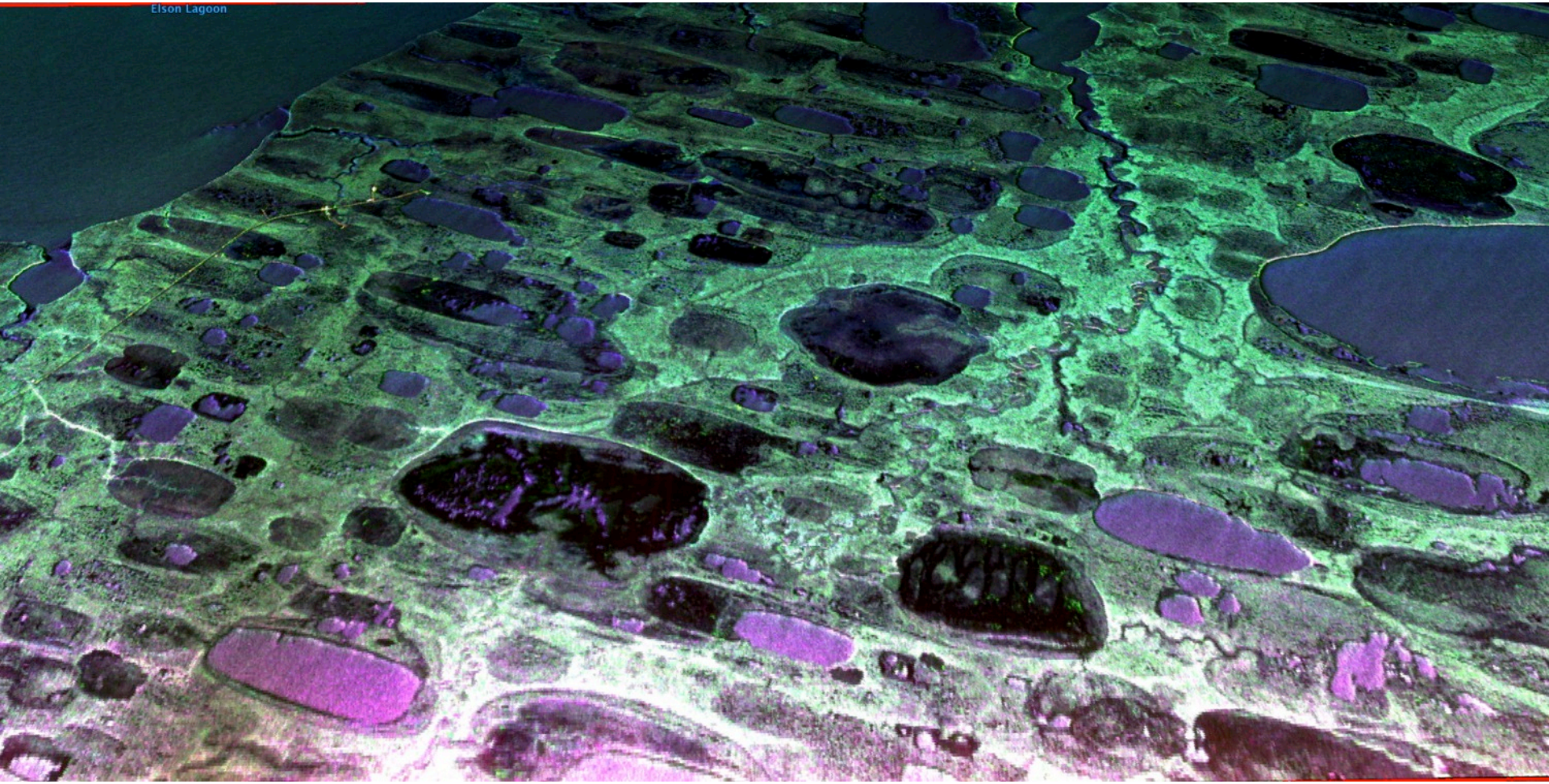
GLISTIN-A Radar Status

- Reintegrated Ka-band radar in a third radar pod
- Conducted two engineering flights in July 2015
- Acquired calibration data over Rosamond Dry Lake (see DEM to the right)
- Integrated Ka-band processor into the UAVSAR production processor flow to reduce turnaround time of data product delivery
- Updated flight planning software and radar operations to support Ka-band data acquisitions in automatic mode
- Working on calibration software to support Earth Venture Oceans Melting Glacier (OMG) mission – image coastal glaciers in Greenland in March from 2016-2019
- Ka-band radar will be ready for other science demonstration flights in 2016 such as sea ice, mountain glaciers, and volcanoes
- Interested users should submit flight request



P-band Imaging of Alaska Permafrost

Objective: Study soil conditions in Northern Alaska permafrost landscapes
PI: Mahta Moghaddam of USC
Campaign plan: image Alaska in August, October, and April for two years to study soil conditions in different seasons



Tentative FY16 Schedule

- UAVSAR (L-band): San Andreas Fault, Sacramento Delta levees, Alaska permafrost, soil moisture (in support of SMAP), and technology demonstration
- UAVSAR's AfriSAR campaign in Gabon in collaboration with ESA
  - Plan to deploy in spring 2016 (late February or early April) jointly with LVIS to study tropical forest in support of NISAR and JEDI missions
- New flight requests from the latest round of ROSES proposals
  - Selection will be made in December 2015/January 2016
- GLISTIN (Ka-band): Greenland deployment for OMG mission
  - TBD science demonstration flights (submit flight requests!)
- AirMOSS (P-band): Alaska permafrost (one flight in April 2016)
  - TBD flights for soil moisture, subsurface imaging, repeat-pass InSAR for deformation studies, and PolInSAR for vegetation studies
  - Instrument is available for tasking (submit flight requests!)

- Total flight hours: 400-600 hours including all 3 frequencies.