CPB:
The CO-SHARPS*
Processing Boutique

Than Putzig
Southwest Research Institute

SHARAD/MARSIS Data Users' Workshop
2014 March 16

* *Colorado Shallow Radar Processing System*

SHARAD Processors

- Italian SHARAD Operations Center (SHOC): “r_” – primary PDS product.
- Smithsonian: UPB, FPB – FPB “s_” in PDS.
- JPL: UPA, FPA⇒ QDA – not in PDS.

UP: unfocused processor
RED: available in CPB

FP: focused processor
Grey: out of use

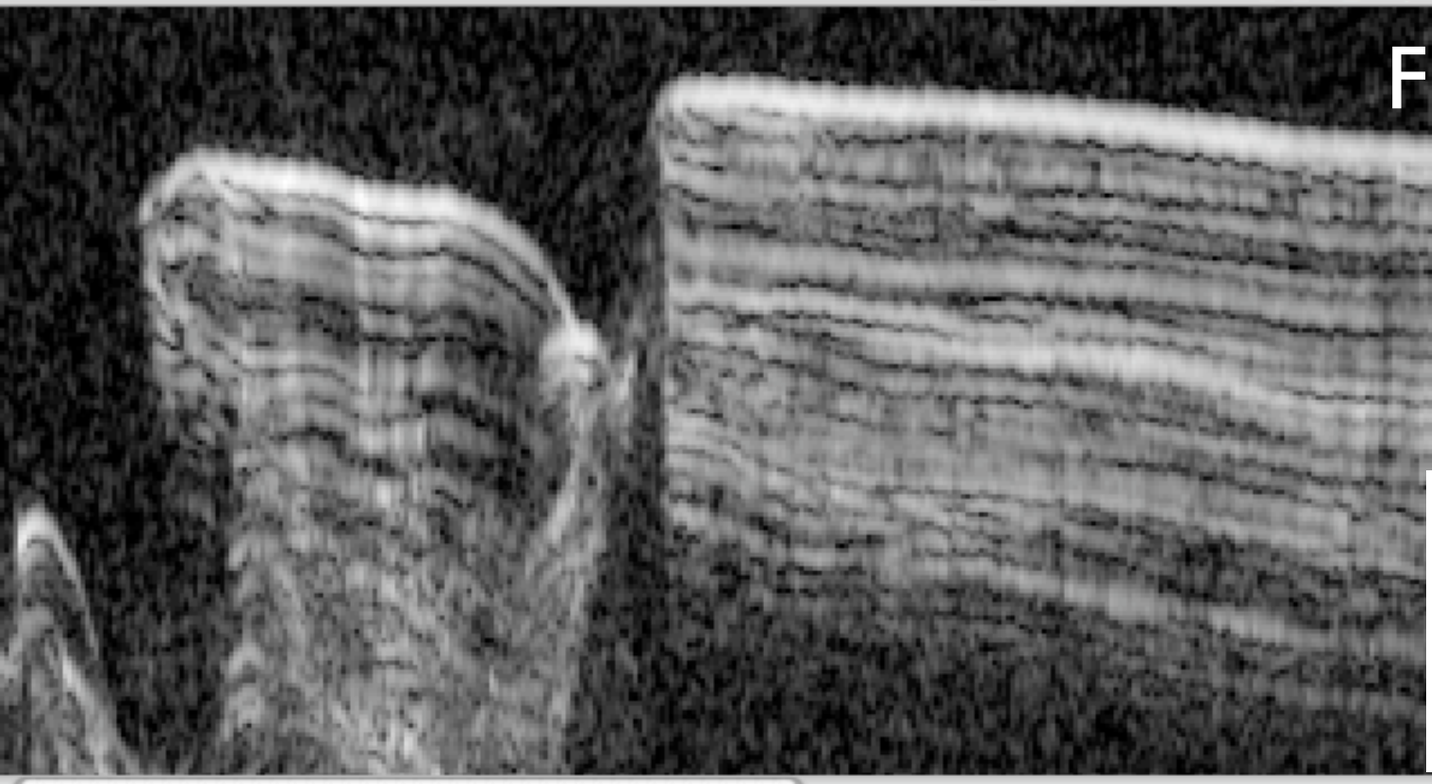
Why a "boutique"?

- Processing of products in PDS uses a fixed set of parameters, chosen to optimize each processor's results on a global basis.
- Regional or local features may not be optimal with default parameters. A custom set of parameters – perhaps dependent on specific science goals – may be desired.
- For example:

NPLD site ↓HiRISE pair

Tests using this rolled nightside observation established processing parameters for a study by Russell et al. correlating SHARAD reflectors with HiRISE layers.

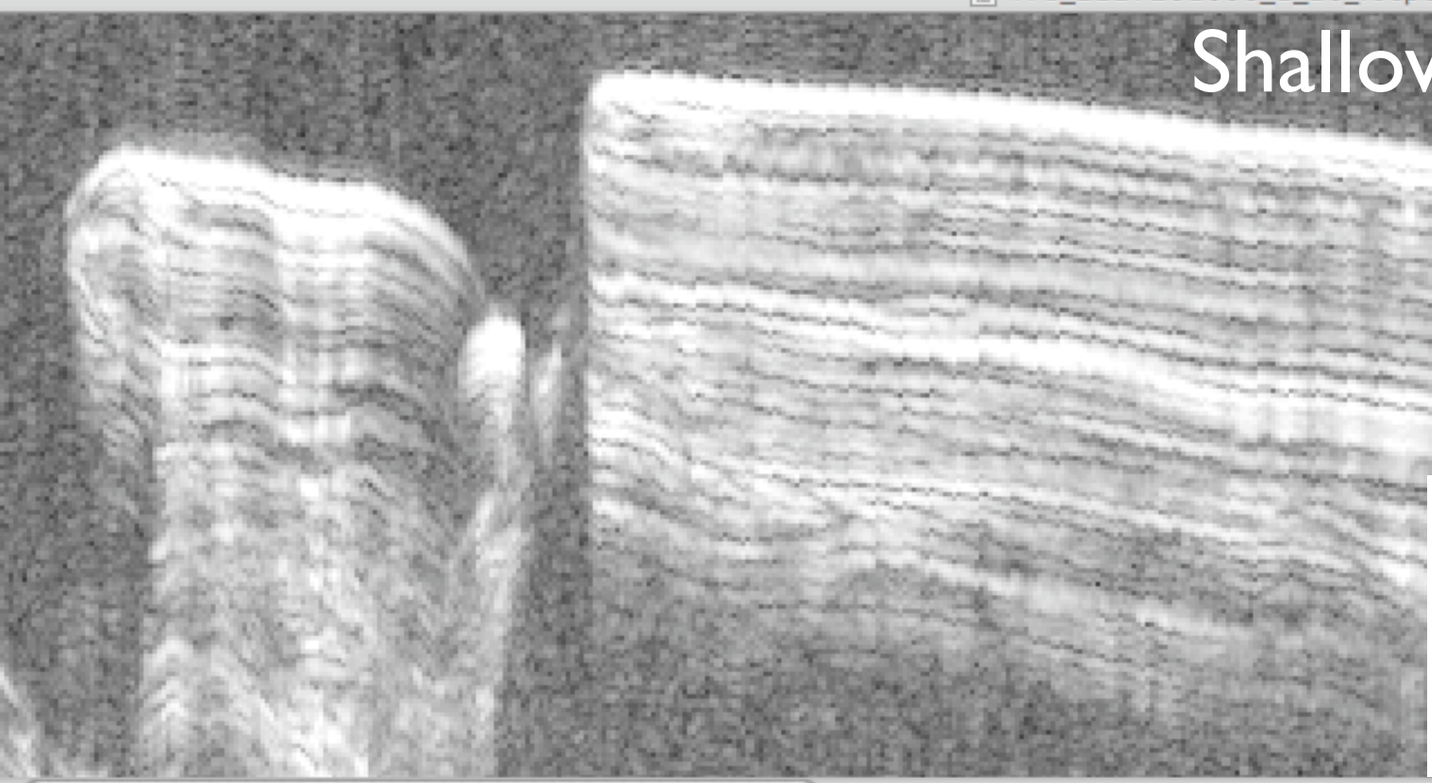
FPB_2227201000_1_01_focpow_001.png



FPB default parameters

- Aperture: 2048 frames
- Range-compression weighting: Hann
- Peak SNR on display: 32 dB
- Multi-look bandwidth: 0.2 Hz

FPB_2227201000_1_26_focpow_001.png



Shallow-enhancement parameters

- Aperture: 1024 frames
- Range-compression weighting: Uniform
- Peak SNR on display: 24 dB
- Multi-look bandwidth: 0.8 Hz

Adjustable Parameters in CPB

Ranges with ~ = recommended. Defaults in **bold** (* = batch runs). Grey = fixed.

Parameter	FPB	QDA
Aperture (frames)	256–8192 **(2048)**	**4096**
Range-compression Weighting	uniform, cosine bell, **Hann**, Hamming	uniform, **Hann**
Peak SNR in PNG (dB)	~16-64 **(32)**	**30**
Focusing method	**multilook**, max bandwidth	**Omega-K, multilook**
Multilook bandwidth (Hz)	0–? **(0.2)**	**15**
Fractional Doppler bandwidth	n/a	0.25–**1.0**
Total presum	n/a	8–64 **(8*, 32)**
Frame interval	**450 m**	Changes with presum
Dielectric for depth conversion	n/a	~2.0-14.0 **(0.0=OFF, 3.1*)**
Chapman N0 (#e^-/cm^3)	n/a	**0=table**, 1=function, **2.3e5***

How does one access CPB?

Visit:

http://boulder.swri.edu/sharad.php

http://boulder.swri.edu/sharad.php

Southwest Research Institute
Planetary Science Directorate

Southwest Research Institute
1050 Walnut St, Suite 300
Boulder, CO 80302

Phone: 303-546-9670
Fax: 303-546-9687

MRO Launch

SHARAD Science Operations at SwRI Boulder

SHARAD is the Shallow Radar instrument onboard MRO, NASA's Mars Reconnaissance Orbiter (MRO). SHARAD is a sounding radar that emits a 10-watt chirped pulse from 15 to 25 megahertz, yielding a 15-m range resolution in free space.

Dielectric contrasts between the atmosphere and surface and between layers in the subsurface (e.g., water and carbon-dioxide ices, ash deposits, lava flows) reflect a portion of the radar signal back toward the spacecraft. The returned signals are detected by the same SHARAD antenna that transmitted the original signal moments earlier. The data are processed onboard and back on Earth to produce radargrams, which are 2-D cross-sectional views of the signal power from the subsurface.

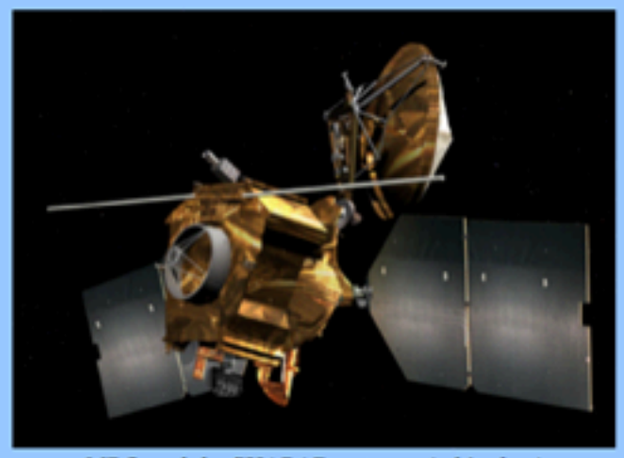
SHARAD was provided to MRO by the Italian Space Agency (ASI) and is operated under contract to SHARAD Team Leader Roberto Seu at the Dipartimento di Ingegneria dell'Informazione, Elettronica e Telecomunicazioni (DIET), University "Sapienza" of Rome. SwRI contributes to instrument operations through the coordination of instrument targeting, led by SHARAD Deputy Team Leader and Institute Scientist Roger Phillips.

In addition to operations support, SwRI hosts the Colorado SHARAD Radar Processing System (CO-SHARPS), which supplements the Italian-produced standard SHARAD products archived in the Planetary Data System. A primary feature of CO-SHARPS is the processing boutique, which allows the use of custom processing parameters to produce radargrams that may better resolve features specific to individual locations on Mars.

CO-SHARPS Access

Beginning 2014 March 16, web access to the CO-SHARPS Processing Boutique is available by request. Please click the 'Request Access' button and complete the email form. A CO-SHARPS staff member will respond with instructions for accessing the system.

Request Access



MRO and the SHARAD antenna (white bar)

SHARAD instrument and antenna (folded for launch)

SHARAD Science Operations at SwRI Boulder

SHARAD Science Operations at ...

boulder.swri.edu/sharad.php

Google

http://boulder.swri.edu/sharad.php

Southwest Research Institute
Walnut St, Suite 300
ulder, CO 80302

ne: 303-546-9670
x: 303-546-9687

Hon

Colloquia

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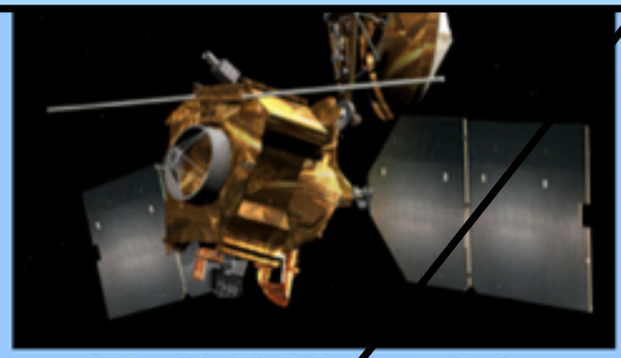

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Request Access

SHARAD Science Operations at SwRI Boulder

SHARAD Science Operations at ...

boulder.swri.edu/sharad.php

Google

http://boulder.swri.edu/sharad.php

Southwest Research Institute
Suite 300
80302
6-9670
-9687

CO-S

Beg
is avail
form.
system

Requ

Request for access to the CO-SHARPS Processing Boutique

Send | Chat | Attach | Address | Colors | Save As Draft | Fonts | Lists | Photo Browser

To: CO-SHARPS Operations <sharad-ops@soc.boulder.swri.edu>

Cc:

Bcc: Nathaniel Putzig <nathaniel@putzig.com>

Reply To:

Subject: Request for access to the CO-SHARPS Processing Boutique

From: Nathaniel Putzig ... than@putzig.com... Signature: None

Dear CO-SHARPS Support:

Please provide access credentials for the CO-SHARPS Processing Boutique.

My required information:

Full name:
Institution:
Email address:
Desired* username:

My interests in SHARAD are:

*CO-SHARPS staff may need to alter username for uniqueness.

MRO Launch

What next?

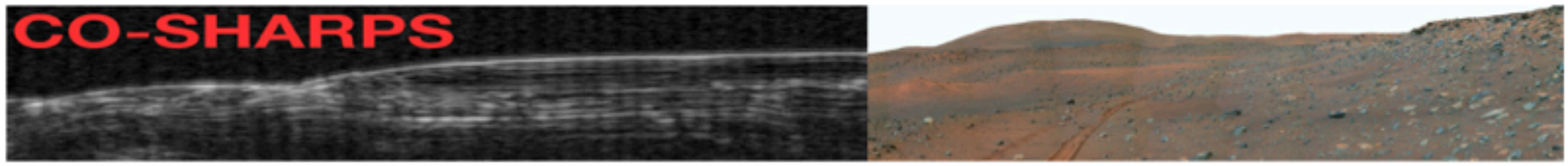
- You will receive instructions for setting up secure-shell (SSH) access to CO-SHARPS.
- Open a browser, go to the local-host URL as instructed, login, and start processing!

Colorado SHARAD Radar Processing System

Colorado SHARAD Radar Proces...

localhost:xxxx

Google



Welcome to the Colorado SHARAD Processing System!

- CO-SHARPS Processing Boutique ← Click here, then enter personal username and password
- SHARAD PDS site

Please acknowledge CO-SHARPS in any publications featuring products from this system.

Processing tools developed in collaboration with

JPL
Jet Propulsion Laboratory
California Institute of Technology

Smithsonian
National Air and Space Museum

INSTITUTE FOR GEOPHYSICS
JACKSON SCHOOL OF GEOSCIENCES

Site hosted at
Southwest Research Institute
Boulder
Colorado USA

Site previously hosted at

Washington
University in St. Louis

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/

Google

The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

change user | user profile

Guest's Processing Runs (2)

add a run | refresh | 35 runs per page

Many items have "hover" help

Point to table headers and entries for explanation

Changes	Run ID	User	Proc	Product ID	D	PI	Submission time	Status	Remarks
DELETE	62496	Guest	QDA	598301000	1	04	2014-03-11 17:30:30	complete	QDA defaults
DELETE	62494	Guest	FPB	598301000	1	05	2014-03-11 14:53:53	complete	FPB defaults

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php

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The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

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Add a Processing Run

Point to items below for explanation

Product	598301000 ← leave blank to use highest dataset version
Remarks	FPB shallow enhancement
Processing Type	FPB / Old FPB / MDIM only / THEMIS only / QDA
Aperture Length	1024
Weighting	uniform / cosine bell / Hann / Hamming
FPB Peak SNR	24
FPB focusing method	normal / max bandwidth
FPB bandwidth window	0.8 Hz
QDA Doppler bandwidth	1.0
QDA total presum	32
QDA dielectric for XGR	0.0
Skip ionospheric correction	☐
Chapman N0 value	0 guide (PDF)
Use prior MAPTRACK results	☑
Model Datum:	areoid / shape spheroid
	☐ include MDIM map
Skip unfocused processing	☑
Skip synthetic generation	☑
Use SHOC chirp calibration	☐

submit run | discard changes | quit

Guest's Processing Runs (2)

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php

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The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

change user | user profile

Add a Processing Run

Point to items below for explanation

FPB parameters

Must use this format for Product ID!!!
598301000, not 598301 or 5983-01

Product: 598301000 ← leave blank to use highest dataset version

Remarks: FPB shallow enhancement

Processing Type: (•) FPB ( ) Old FPB ( ) MDIM only ( ) THEMIS only ( ) QDA

Aperture Length: 1024 — 2048 6400

Weighting: (•) uniform ( ) cosine bell ( ) Hann ( ) Hamming

FPB Peak SNR: 24 — 32

FPB focusing method: (•) normal ( ) max bandwidth

FPB bandwidth window: 0.8 Hz — 0.2 0.6

Defaults

"Long-aperture" (e.g., NPLD)

QDA parameters

QDA Doppler bandwidth: 1.0

QDA total presum: 32

QDA dielectric for XGR: 0.0

Skip ionospheric correction: [ ]

Chapman N0 value: 0 guide (PDF)

Use prior MAPTRACK results: [x] ← Uncheck for ground-track maps

Model Datum: ( ) areoid ( ) shape spheroid

[ ] include MDIM map

Skip unfocused processing: [x] ← Uncheck for UPB radargrams

Skip synthetic generation: [x] ← Uncheck for Smithsonian synthetics

Use SHOC chirp calibration: [ ] (but you probably will prefer UT ones)

→ submit run | discard changes | quit

Guest's Processing Runs (2)

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php

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The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

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Guest's Processing Runs (3)

add a run | refresh | 35 runs per page

Point to table headers and entries for explanation

Changes	Run ID	User	Proc	Product ID	D	PI	Submission time	Status	Remarks
DELETE	62497	Guest	FPB	598301000	1	06	2014-03-11 17:49:30	submitted	FPB shallow enhancement

	Processor version	0.0
	Focusing	normal
	FFT Length	1024
	Weighting	uniform
hide	Skip ionospheric correction	no
	Chapman N0	0
edit	PNG Peak SNR	24
	Bandwidth Window	0.8 Hz
	Use prior MAPTRACK results	yes
	Skip SHARAD_GRAM	yes
	Skip SHARAD_SIMU	yes
	SHOC chirp calibration	no

DELETE	62496	Guest	QDA	598301000	1	04	2014-03-11 17:30:30	complete	QDA defaults
DELETE	62494	Guest	FPB	598301000	1	05	2014-03-11 14:53:53	complete	FPB defaults

Status is "submitted" if other jobs are ahead of this one in the queue or if the daemon is DOWN.

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php

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The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

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Guest's Processing Runs (3)

add a run | refresh | 35 runs per page

Point to table headers and entries for explanation

Changes	Run ID	User	Proc	Product ID	D	PI	Submission time	Status	Remarks
KILL	62497	Guest	FPB	598301000	1	06	2014-03-11 17:49:30	Mode 1	FPB shallow enhancement

	Processor version	8.1
	Focusing	normal
	FFT Length	1024
	Weighting	uniform
hide	Skip ionospheric correction	N/A
	PNG Peak SNR	24
edit	Bandwidth Window	0.8 Hz
	Use prior MAPTRACK results	yes
	Skip SHARAD_GRAM	yes
	Skip SHARAD_SIMU	yes
	SHOC chirp calibration	N/A

DELETE	62496	Guest	QDA	598301000	1	04	2014-03-11 17:30:30	complete	QDA defaults
DELETE	62494	Guest	FPB	598301000	1	05	2014-03-11 14:53:53	complete	FPB defaults

Status changes to "Mode* X" when this job is running.

Please notify CO-SHARPS Support if you get an "Error" status.

** Many early-mission observations were acquired with multiple modes (two or more separate segments along the ground track. The focused processors merge these modes together automatically.*

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The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php

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The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

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Guest's Processing Runs (3)

add a run | refresh | 35 runs per page

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Changes	Run ID	User	Proc	Product ID	D	PI	Submission time	Status	Remarks
DELETE	62497	Guest	FPB	598301000	1	06	2014-03-11 17:49:30	complete	FPB shallow enhancement

	Processor version	8.1
	Focusing	normal
	FFT Length	1024
	Weighting	uniform
hide	Skip ionospheric correction	N/A
	PNG Peak SNR	24
edit	Bandwidth Window	0.8 Hz
	Use prior MAPTRACK results	yes
	Skip SHARAD_GRAM	yes
	Skip SHARAD_SIMU	yes
	SHOC chirp calibration	N/A

DELETE	62496	Guest	QDA	598301000	1	04	2014-03-11 17:30:30	complete	QDA defaults
DELETE	62494	Guest	FPB	598301000	1	05	2014-03-11 14:53:53	complete	FPB defaults

When job is complete, you will get an email notice.

Status field becomes a link to output products.

The CO-SHARPS Processing Boutique

The CO-SHARPS Pr

PROCESSING DETAILS - 62497

localhost: xxxx/CPB/show_proc_details.php?runid=62497&proc=FPB

FPB run details

Run id = **62497**

Product_id	598301000
Dataset	1
Processing instance	6
Processor version	8.1
Error code	0
Processing date	2014-03-11 17:49:30
User processed	guest
Processing remarks	FPB shallow enhancement
Model	0
FFT_Len	1024
Win_type	0
Orbit	4859
Chapman N0	0
Peak SNR for PNG	24
Focusing	1
Window Bandwidth	0.8 (Hz)
Skip Map	1
Skip Unfocused	1
Skip Simulation	1
Skip Ionospheric	0
SHOC Calibration	0

Processor products

Dir Id	Date archived	Size	Filename	
26026	2014-03-11 17:49:30	19M	**FPB_598301000_1_06_focpow_001.raw**	show
26026	2014-03-11 17:49:30	1k	**FPB_598301000_1_06_upsim_001.txt**	show
26026	2014-03-11 17:49:30	5k	**FPB_598301000_1_06_up_001.log**	show
26026	2014-03-11 17:49:30	4k	**FPB_598301000_1_06_Orbit_001.txt**	show
26026	2014-03-11 17:49:30	3k	**FPB_598301000_1_06_sharp.log**	show
26026	2014-03-11 17:49:30	46k	**FPB_598301000_1_06_pixlation_001.txt**	show
26026	2014-03-11 17:49:30	1k	**FPB_598301000_1_06_up_inputdata.txt**	show
26026	2014-03-11 17:49:30	56k	**FPB_598301000_1_06_ion_001.eps**	show
26026	2014-03-11 17:49:30	4M	**FPB_598301000_1_06_focpow_001.png**	show

Close window

The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

change user | user profile

Guest's Processing Runs (3)

add a run | refresh | 35 runs per page

Point to table headers and entries for explanation

Changes	Run ID	User	Proc	Product ID	D	PI	Submission time	Status	Remarks
DELETE	62497	Guest	FPB	598301000	1	06	2014-03-11 17:49:30	complete	FPB shallow enhancement

	Processor version	8.1
	Focusing	normal
	FFT Length	1024
	Weighting	uniform
hide	Skip ionospheric correction	N/A
	PNG Peak SNR	24
edit	Bandwidth Window	0.8 Hz
	Use prior MAPTRACK results	yes
	Skip SHARAD_GRAM	yes
	Skip SHARAD_SIMU	yes
	SHOC chirp calibration	N/A

DELETE	62496	Guest	QDA	598301000	1	04	2014-03-11 17:30:30	complete	QDA defaults
DELETE	62494	Guest	FPB	598301000	1	05	2014-03-11 14:53:53	complete	FPB defaults

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php

Google

The CO-SHARPS Processing Boutique

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Links: Product Guide FPB Documentation SHARAD PDS site

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http://localhost:8081/CPB/guides/product_guide.pdf

http://localhost:8081/CPB/guides/product_guide.pdf

Google

Google | iCloud | News (1,24xxxx | Reading | Putzig | Radar | SwRI | NASA | Mars (75) | IDL | Golden NWS | Recreation | Transit | London | Shopping

http://localhost:8081/CPB/guide...

Reference Guide to CO-SHARPS Products

By Lynn Carter and Than Putzig V 1.5, 2014 March 12

This guide lists files read or produced by the Colorado SHARAD Radar Processing System (CO-SHARPS), which includes the decoder and processors developed and maintained by the US SHARAD Team. Batch and boutique products are included. Products of the Italian SHARAD Operations Center (ShOps, formerly SHOC) processor are delivered via the Planetary Data System and are not described here.

Files produced by the various processors have the following naming convention:

[key]_[product_id]_[dataset_issue]_[proc_inst]_[proc_prod]_[mode].[ext]

where:

[key]:	Processor type:	Lead developer:
OBS	CO-SHARPS decoder	Fabrizio Bernardini
UPA[1,2]	JPL unfocused processor	Ali Safaeinili
FPA[2]	JPL focused processor	Ali Safaeinili
QDA	JPL focused processor, revised	Ali, Yonggyu Gim
UPB	Smithsonian unfocused processor	Bruce Campbell
FPB	Smithsonian focused processor	Bruce Campbell

The CO-SHARPS Processing Boutique

The CO-SHARPS Pr

PROCESSING DETAILS - 62497

localhost: xxxx/CPB/show_proc_details.php?runid=62497&proc=FPB

FPB run details

Run id = **62497**

Product_id	598301000
Dataset	1
Processing instance	6
Processor version	8.1
Error code	0
Processing date	2014-03-11 17:49:30
User processed	guest
Processing remarks	FPB shallow enhancement
Model	0
FFT_Len	1024
Win_type	0
Orbit	4859
Chapman N0	0
Peak SNR for PNG	24
Focusing	1
Window Bandwidth	0.8 (Hz)
Skip Map	1
Skip Unfocused	1
Skip Simulation	1
Skip Ionospheric	0
SHOC Calibration	0

Processor products

Dir Id	Date archived	Size	Filename	
26026	2014-03-11 17:49:30	19M	**FPB_598301000_1_06_focpow_001.raw**	show
26026	2014-03-11 17:49:30	1k	**FPB_598301000_1_06_upsim_001.txt**	show
26026	2014-03-11 17:49:30	5k	**FPB_598301000_1_06_up_001.log**	show
26026	2014-03-11 17:49:30	4k	**FPB_598301000_1_06_Orbit_001.txt**	show
26026	2014-03-11 17:49:30	3k	**FPB_598301000_1_06_sharp.log**	show
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26026	2014-03-11 17:49:30	56k	**FPB_598301000_1_06_ion_001.eps**	show
26026	2014-03-11 17:49:30	4M	**FPB_598301000_1_06_focpow_001.png**	show

Close window

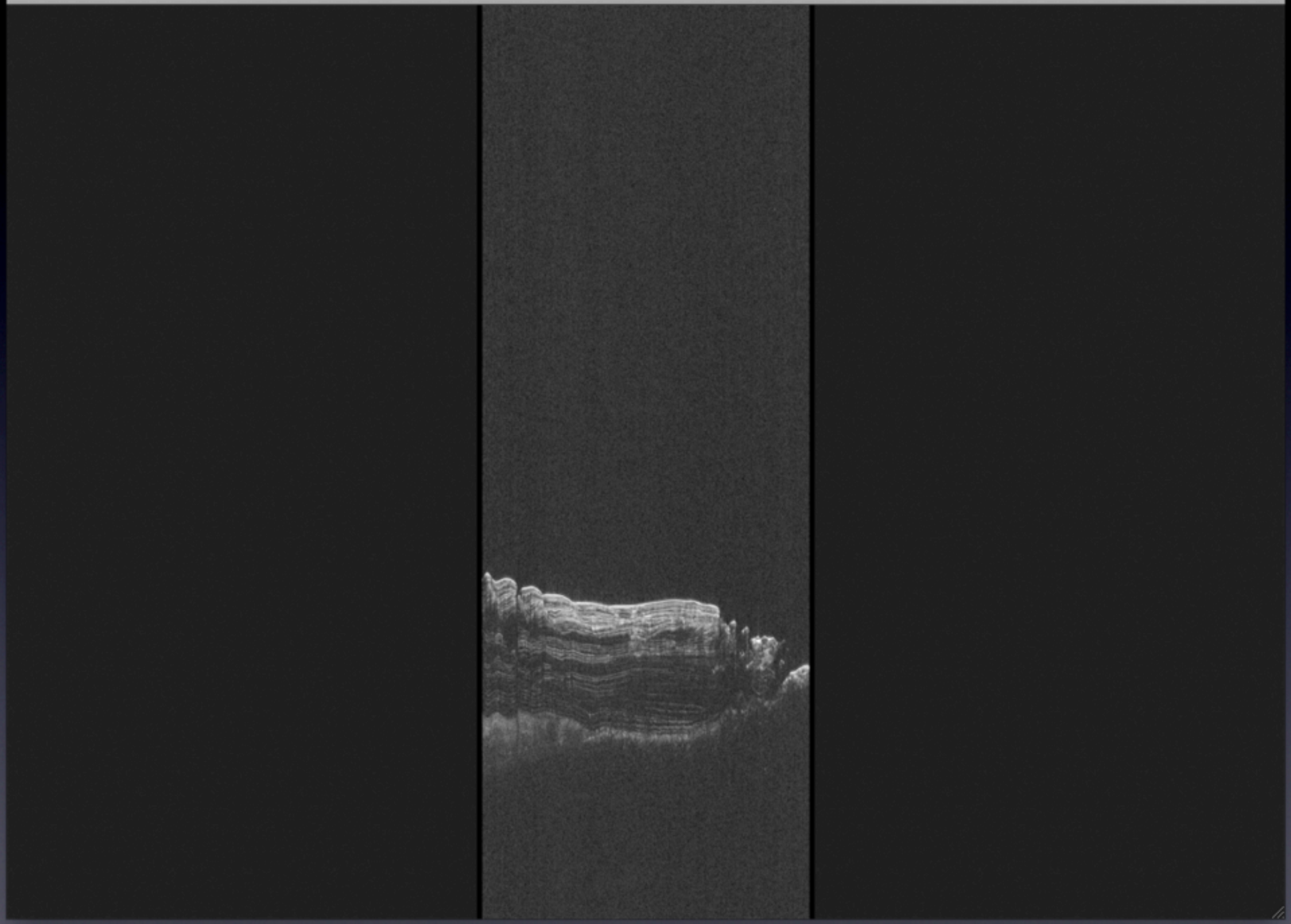
FPB_598301000_1_06_focpow_001.png (PNG Image, 1334 × 3600 pixels) – Scaled (20%)

The CO-SHARPS Processing Bo...

FPB_598301000_1_06_focpow_...

localhost:xxxx/data/g/WUSHARPS/Archive/FPB_PROD/FPB_PROD_0590

Google



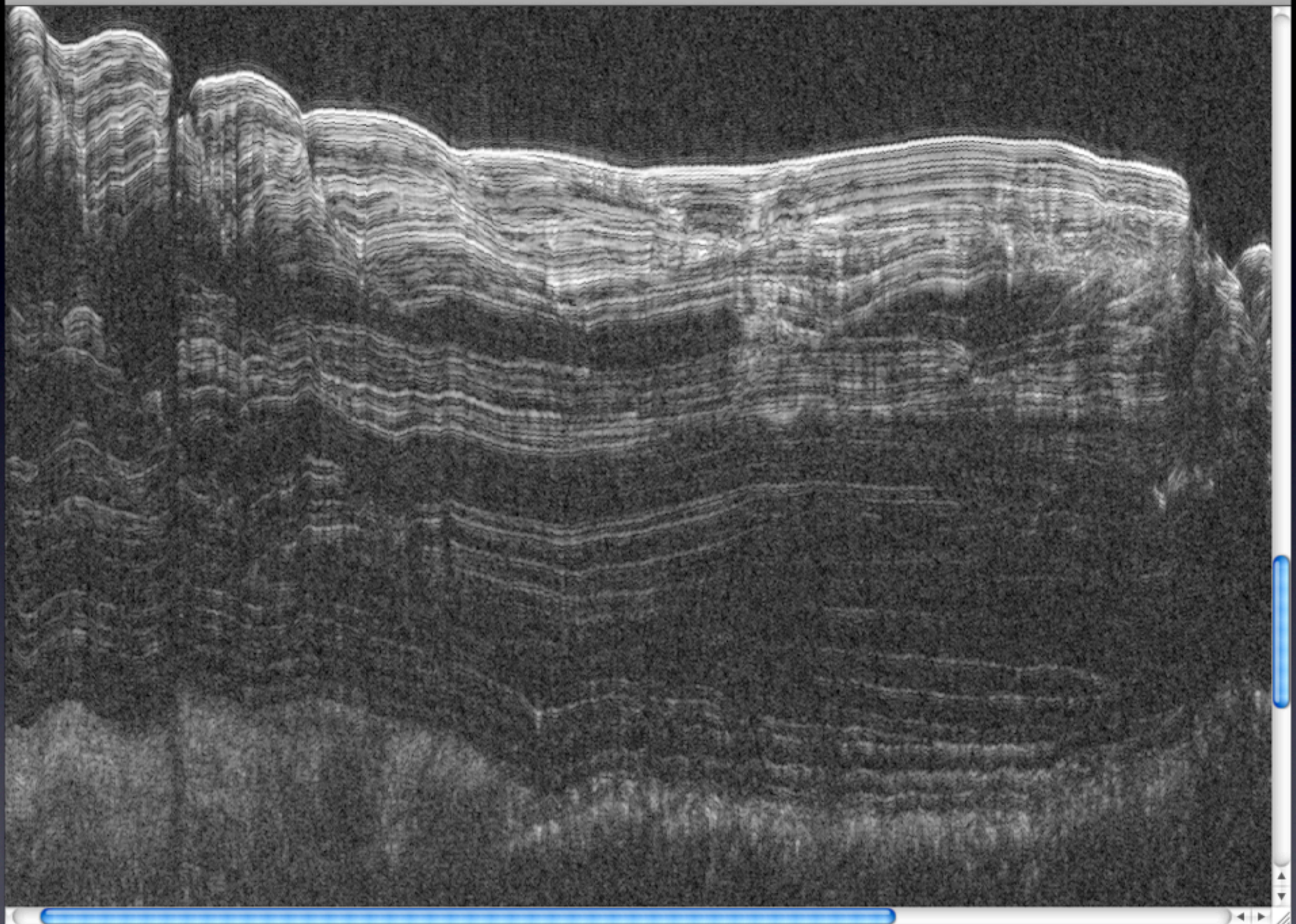
FPB_598301000_1_06_focpow_001.png (PNG Image, 1334 × 3600 pixels)

The CO-SHARPS Processing Bo...

FPB_598301000_1_06_focpow_...

localhost:xxxx/data/g/WUSHARPS/Archive/FPB_PROD/FPB_PROD_0590

Google



Shallow-enhancement parameters

Shallow-enhancement parameters

Default parameters

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php?dispv=62496#sel

Google

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Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

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Guest's Processing Runs (3)

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Changes	Run ID	User	Proc	Product ID	D	PI	Submission time	Status	Remarks
DELETE	62497	Guest	FPB	598301000	1	06	2014-03-11 17:49:30	complete	FPB shallow enhancement
DELETE	62496	Guest	QDA	598301000	1	04	2014-03-11 17:30:30	complete	QDA defaults

Processor version	0.96
Focusing	QDA
FFT Length	4096
Weighting	Hann
Fractional Doppler bandwidth	1
Total presum	32
Dielectric for XGR	0
Skip ionospheric correction	no
Chapman N0	0
Skip UT simulation	yes

hide

edit

QDA parameters

No depth conversion is default

No clutter simulation is default

DELETE	62494	Guest	FPB	598301000	1	05	2014-03-11 14:53:53	complete	FPB defaults

The CO-SHARPS Processing Boutique

The CO-SHARPS Processing Bo...

localhost:xxxx/CPB/cpb_proc.php

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The CO-SHARPS Processing Boutique

Welcome, Guest. Daemon is UP on gladius (FPB) and UP on anlace1 (QDA)
Links: Product Guide FPB Documentation SHARAD PDS site

change user | user profile

Edit a Processing Run

Point to items below for explanation

QDA parameters

Run ID 62496
Product 598301000_1
Remarks QDA defaults + XGR + UTSim
Processing Type ○ FPB ○ Old FPB ○ MDIM only ○ THEMIS only ◉ QDA
Aperture Length 4096
Weighting ○ uniform ○ cosine bell ◉ Hann ○ Hamming

FPB parameters

FPB Peak SNR
FPB focusing method ○ normal ○ max bandwidth
FPB bandwidth window Hz

QDA Doppler bandwidth 1
QDA total presum 32
QDA dielectric for XGR 3.15 ← Non-zero value will yield depth conversion
Skip ionospheric correction ☐
Chapman N0 value 0 guide (PDF) ← Use this guide!

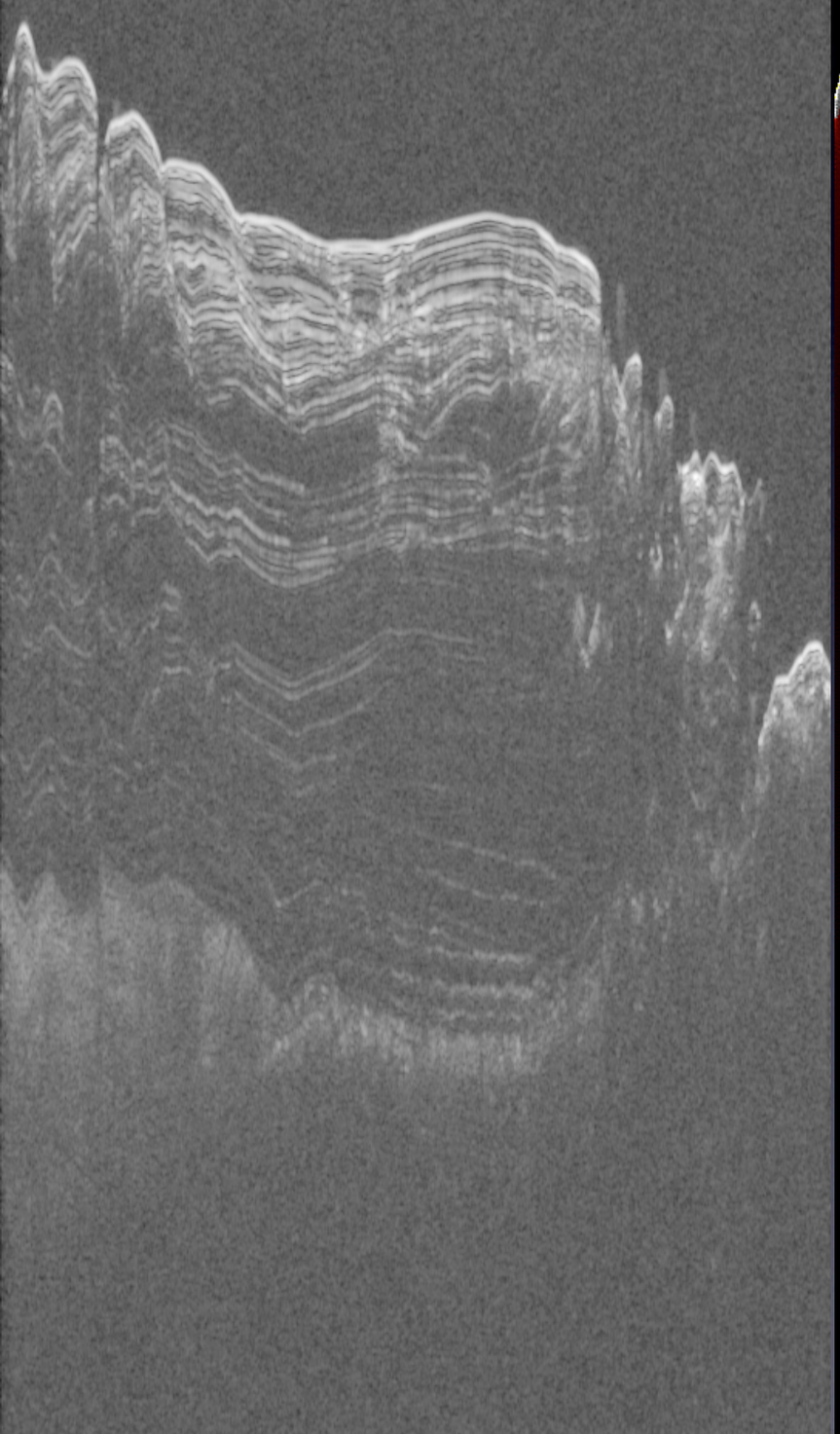
Use prior MAPTRACK results ☐
Model Datum: ○ areoid ○ shape spheroid
☐ include MDIM map
Skip unfocused processing ☐
Skip synthetic generation ☐ ← Uncheck for simulation
Use SHOC chirp calibration ☐

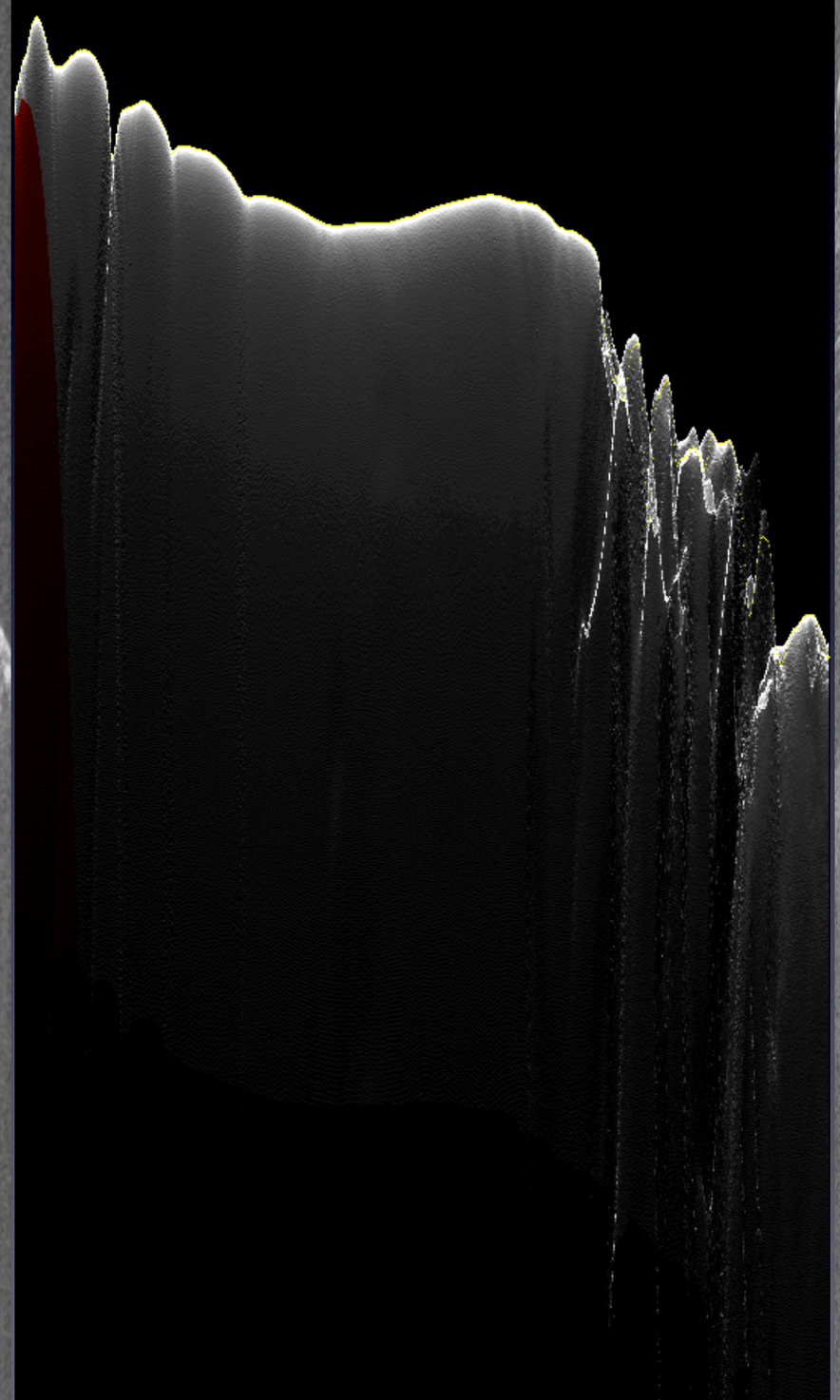
→ resubmit run | discard changes | quit

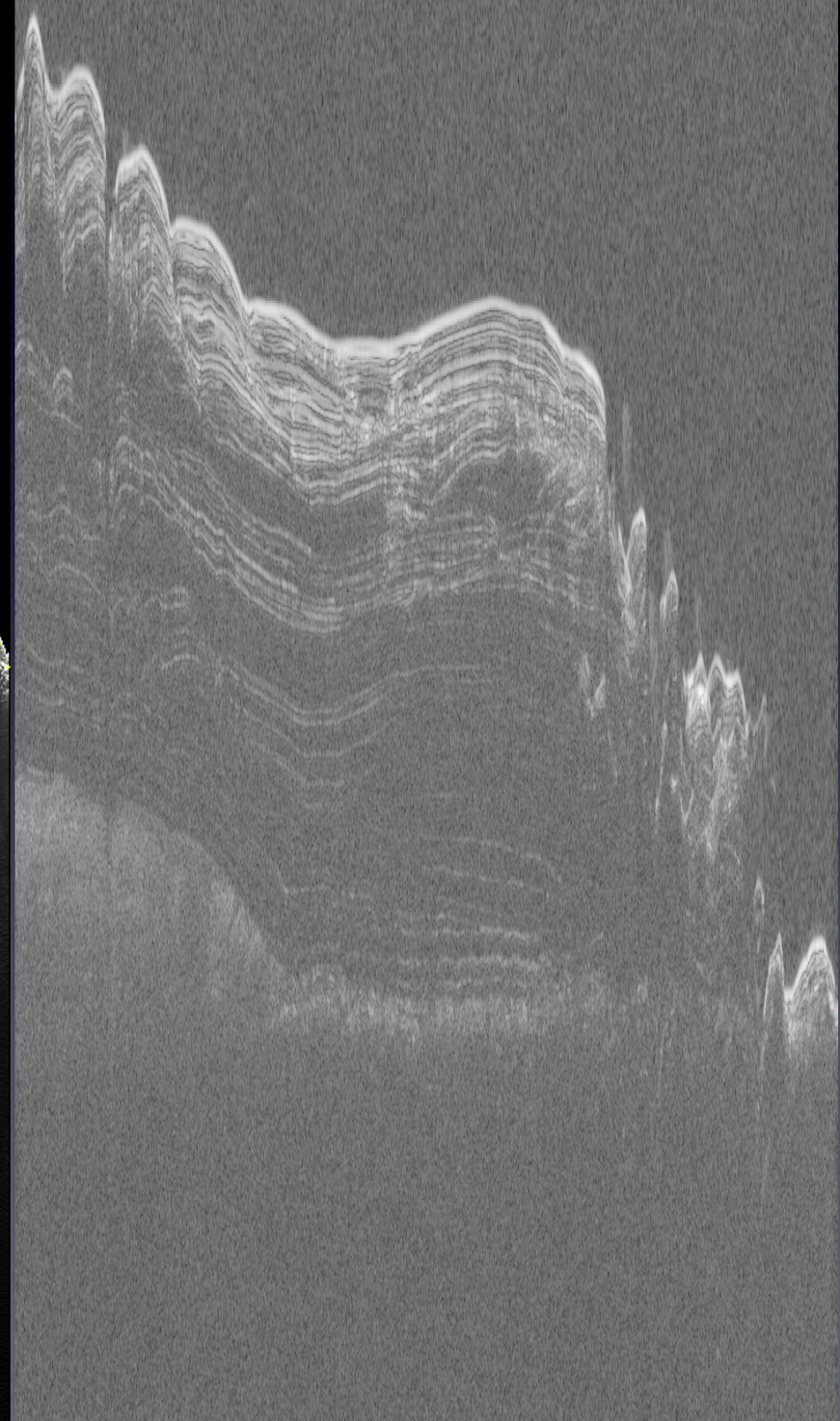
QDA multilook

UT Simulation

QDA DepthCon
ε′ = 3.15







FPB_598301000_1_05_focpow_001.png (PNG Image, 1334 × 3600 pixels)

The CO-SHARPS Processing Bo... | FPB_598301000_1_05_focpow_...

localhost xxxx /data/g/WUSHARPS/Archive/FPB_PROD/FPB_PROD_0590

Google

FPB default parameters

QDA_598301000_1_04_Mode_001.dat.mlk.png (PNG Image, 541 × 4096 pixels)

The CO-SHARPS Processing Bo... | FPB_598301000_1_06_focpow_... | QDA_598301000_1_04_Mode_0...

localhost xxxx /data/a1/WUSHARPS/Archive/QDA_PROD/QDA_PROD_05

Google

QDA default parameters
Presum = 32

Processors have different along-track sampling and datum (QDA: ellipsoid; FPB: areoid)

Questions?

For CPB access, visit:

http://boulder.swri.edu/sharad.php