ARM Science Products

Status, Major Ongoing Efforts, and Challenges

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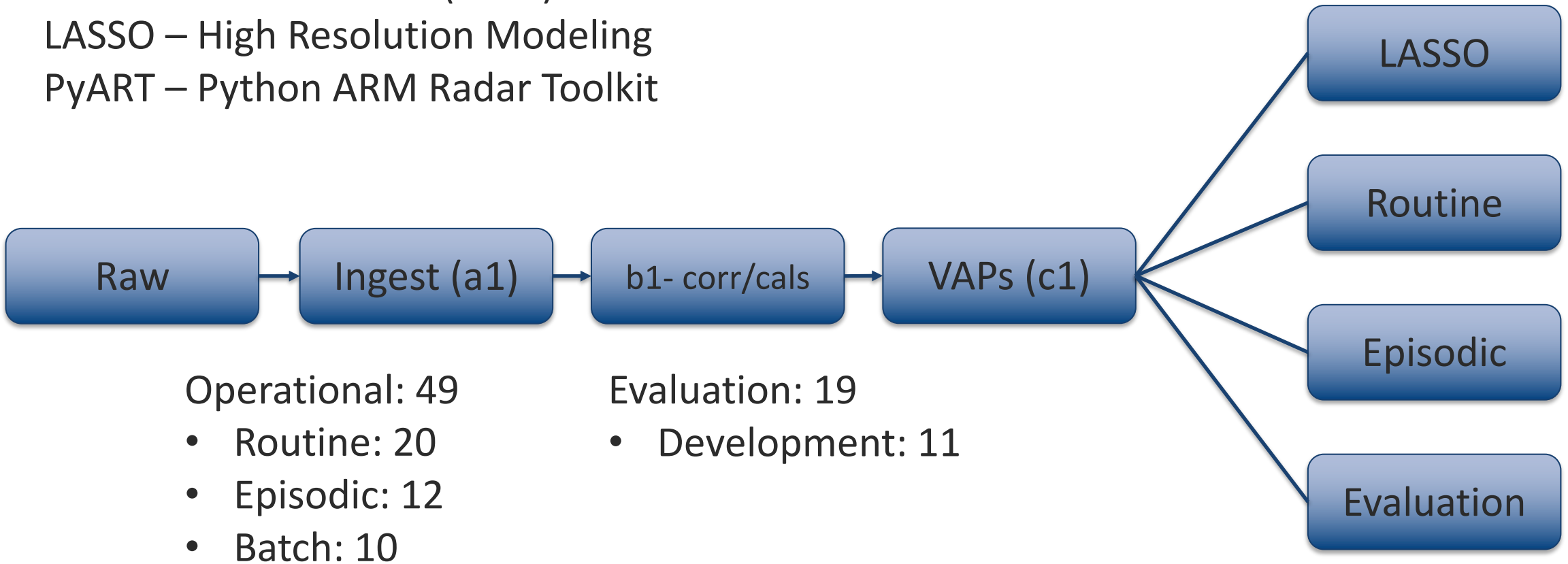
Science Products

Value Added Products (VAPs)
LASSO – High Resolution Modeling
PyART – Python ARM Radar Toolkit



Operational: 49
- Routine: 20
- Episodic: 12
- Batch: 10
- Development: 3

Evaluation: 19
- Development: 11

Current Major Focus Areas – Value Added Products (VAPs)

- New VAP development
  - PARSQUANTS – precipitation drop size distribution, radar quantities, DSD parameters
  - Photogrammetry products
  - *CMAC, AERIoe, MWR-RETv2, MicroARSCL*
- Data Epochs and Virtual Field Campaigns
  - Improving measurement corrections and VAP improvements
    - MWR3C bias corrections → MWRRETv2 (LWP/PWV)
    - KAZR spectra processing to reduce clutter
    - Improved MPL corrections → MPL PBLHT; MPLCMASK
  - X-SAPR Analysis at SGP
- Automating / improving Data Quality assessment (i.e. AOS Harmonization, QCAOD)
- Extending core VAPs and requested VAPs for ARM Mobile Facility (AMF) deployments
- Routine processing at fixed sites (ARSCL, QCRAD/RADFLUX, ARMBE, VARANAL, MWRRETv1,v2…)
- Supporting LASSO product development and operations (i.e. AERIoe, VARANAL, etc.)
- VAP Maintenance

Challenges and Solutions

- Resource limited – Juggling needs of community vs finite resources
  - Prioritization is key
- Dependencies
  - Input data availability
  - VAP Upgrades affect downstream VAPs
    - MFRSR 1625 nm → ingest / Langley upgrades → [MFRSR CLDOD, Area Avg Spectral Albedo, etc]
  - Input data quality
    - Radiometrics MWR3C biases
    - MPL Corrections – overlap, after-pulse improve backscatter/depol
- **Uncertainties**
- Running complex VAPs on high performance computing machines
- Release process – implementing new workflows

FY19 VAP Efforts

Aerosol (John Shilling)	Modeling (Shaocheng Xie)	Radar	Cloud
ACSM Aerosol Composition	VARANAL Routine/AMF/LASSO	[1]b-level products for CACTI	[2]CSPHOT Cloud Mode VAP
Aerosol Size Distribution	ARMBE NSA	[2]MicroARSCL	[2]LASSO related VAPs
Aerosol Absorption	Radar Simulator	[2]KAZR-ARSCL Updates / AMFs	[2]OGRE Cloud Properties
Aerosol Optical Depth (QCAOD)	Process Oriented Model Diagnostics (ARM-DIAG) Convection Onset Metrics	KAZR Spectra Processing	*[4] Core AMF VAPs – AWARE, LASIC, MARCUS, MICRE
Gas Phase	QCECOR, BAEBBR	[2]SACR ADV VAPs – VAD, QVP, 3D3C	[4]MPLCMASK
Raman & HSRL Lidar Profiles		[3]CMAC2.0 – CSAPR2 CACTI	[4]MWRRET2 – MWR3C
		RWP Boundary Layer Height	[4]Drop Num Conc – LASIC, ACE-ENA

1 – Joe Hardin
2 – Scott Giangrande
3 – Scott Collis
4– TBD (J. Comstock)

*As Applicable: QCRAD, RADFLUX, MWRRET, MPLCMASK, PBLHT, DLPROF, AERINF, MFRSRCLDOD

FY20 VAP (Draft) Plans

Aerosol	Modeling	Radar	Cloud
OACOMP Aerosol Composition	VARANAL Routine/LASSO, CACTI, ACE-ENA, AWARE	b-level products for MOSAiC/COMBLE	Improved PBLHT (i.e. MPL, DL)
Merge Aerosol Size Dist.	ARMBE ENA/AMFs	ARSCL CloudSat Calibration	LASSO related VAPs
Aerosol Absorption	Radar Simulator	KAZR-ARSCL MOSAiC/COMBLE	OGRE Cloud Properties
Aerosol Optical Depth Best Estimate	Process Oriented Model Diagnostics (E3SM & PCMDI) Convection Onset Metrics	RWP Adaptive Modes	*Core AMF VAPs – CACTI, MOSAiC, COMBLE
CCN Product (Kappa)		SACR ADV VAPs MOSAiC/COMBLE	MPLCMASK – Improved algorithm
Multi-wavelength lidar ret.		CMAC2.0 – CACTI CSAPR2, SGP XSAPRs, ACE-ENA XSAPR2	MWRRET2 – MWR3C

*As Applicable: QCRAD, RADFLUX, MWRRET, MPLCMASK, PBLHT, DLPROF, AERINF, MFRSRCLDOD