The LifeWatch ERIC Biodiversity & Ecosystem BEeS eScience Conference 000,000

Seville 22-24/05/23

Threats and challenges to biodiversity and ecosystem conservation from an eScience perspective





UvA

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Animal Movement Ecology group







UNIÓN EUROPEA Fondo Europeo de Desarrollo Regional



Airspace is crowded

Aeroecology conflicts with infrastructure

- Wind turbine impact
- Bird strikes in aviation
- High-rise buildings















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Meteorological Radars







Infrastructure - AME

- National compute clusters
 - Lisa & Snellius (Surf)
 - +/- 1 TB/h
- 150 TB Tape archive (Surf)
- Research Cloud (Surf)
- 90 TB S3 Live server (UvA)
- R packages (UvA)











Large volumes of data are required for identification of migration patterns

- Multi temporal data
- Migration routes cross multiple national borders
- Variation of weather requires multiple seasons of analysis
- Maintenance of infrastructure
 - Servers
 - Databases
- Accessibility to institute compute systems









Infrastructure challenges

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- Access to infrastructure
- Institute
- Compute environment
- Security introduces rigidity
 - Hampers collaboration
 - A 'Necessary evil'
- Re-use of complex framework
- Understanding of code









Solution Virtual Research Environment

Domain experts develop a collection of functional blocks and workflows allowing users to 'quick-start'

- Radar Aeroecology VRE
- NaaVRE as basis
- Transfer of existing code to NaaVRE
- Building small 'lego' blocks
- Re-use of existing blocks
- Splitting / merging tools for concurrency





Reduced compute threshold

No requirements of programming

Anyone can create/review code

'Block' library

		Explore Cell	Catalogs			
Catalog	•	Convert-KNMI-ODIM-v01-DUM			<u> </u>	
visualize-PVOL-v01-berendwije	ers	knmi_paths	pvol_pat	hs 🔴		
list-PVOL-files-v01-berendwijer	S				L	
list-PVOL-files-v02-berendwijer	s					
visualize-PVOL-v02-berendwije	ers	Inputs and Outputs				
Download-KNMI-files-Den-Held berendwijers	ler-v03-	knmi_paths	input	list		
Download-KNMI-files-Herwijner berendwijers	n-v03-	pvol_paths	output	list		
berendwijers	IVI T-	Parameters				
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Workflow manager

Workspace			
Download-KNMI-files- Herwijnen-v03-berendwijers	^	List-KNMI-files-Herwijnen-v02-b	Download-KNMI-files-Herwijnen
Ō	j	dataset_files	dataset_files
Convert-KNMI-ODIM-v01- DUMMY-berendwijers			
Ō	j		
List-KNMI-files-Herwijnen-v02- berendwijers			
Ō			







Component containerizer

RDRTP_KNMLipvnb

Fair cells





#Download-KNMI-files-Herwijnen-v04

##libraries

import requests

from pathlib import Path





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Current RA-VRE blocks

Current blocks

Repository indexer

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- File download
- Format converter
- Vol2bird processor
- Local repository indexer
- Visualizer (Python)



Results in workflows

- Download files from any Radar in NL
- Visualize any radar in VRE
- Produce derivatives from any radar in VRE





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Future RA-VRE blocks

- Future blocks
- Repository indexer

BEeS

- DE, DK, ...
- File check
- bioRad visualizer (R)
 https://github.com/adokter/bioRad
- Parameter recalculation
- Vertical Profile customization
- Block performance
- Block triggers
- UvaRadar (R)
 - https://gitlab.com/uva_ibed_ame/weather_radar/uvaradar

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Results in workflows

- Real time data acquisition and visualization
- Multi-radar visualizations
- Range Bias Correction calculation



Workflow use-case: artifacts

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- Investigation of data artifacts
- Real time data pipeline
 - Data acquisition
 - Processing
 - Visualization
- Data exploration
- Accessibility of data on mobile devices
- in-situ observations





conservation from an eScience perspective







Workflow use-case: artifacts









Collaboration use-case

GloBAM - UvA

150 radars

Processing request for aloftdata.eu

- 15 TB
- Technical requirements
 - Data storage quota
 - <u>Retrieval of code</u>
 - <u>Compilation of processors</u>
 - Instructions of module loading
 - Library matching
 - Adjust RC
 - Additional file checks



- Administrative requirements
 - Access
 - UvA
 - Surf
 - Compute hours





Collaboration use-case

GloBAM - UvA

Processing request for aloftdata.eu

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- 150 radars



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Thank you! | www.lifewatch.eu/bees-2023

