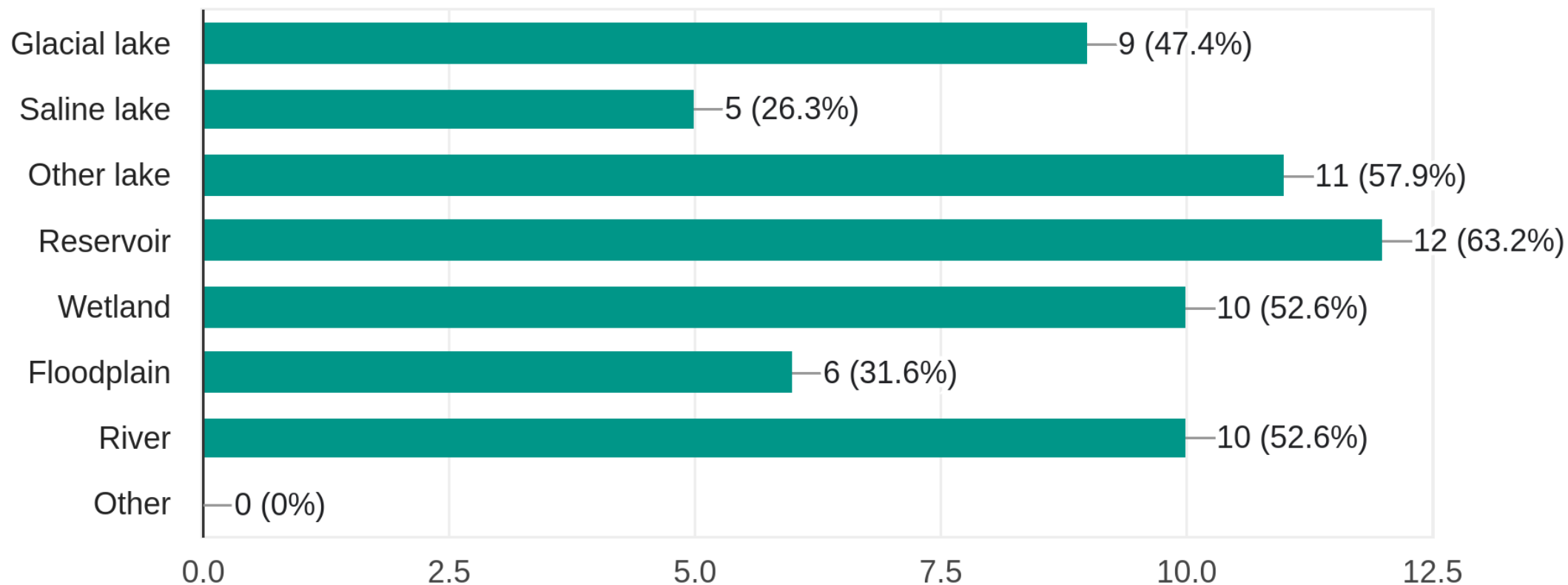


# SWOT Lake and Wetland Sciences (SLeW) Working Group poll results

from 19 responses received in June 2024

## Which type of water bodies are you studying? (Check all that apply)

19 responses

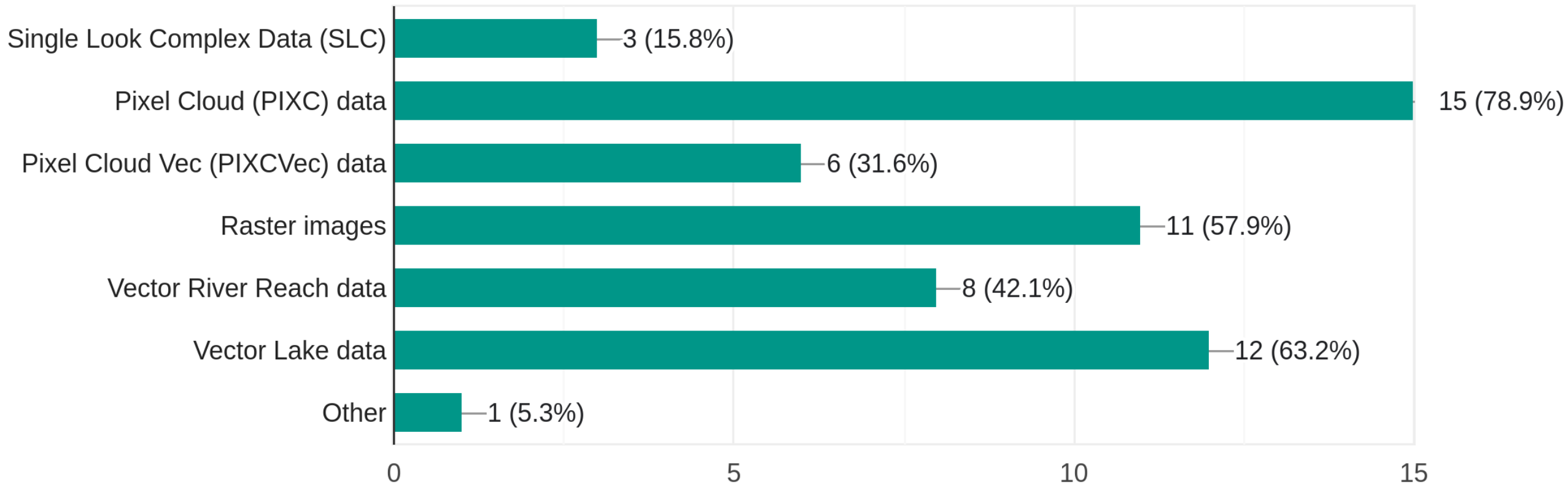


# Can you describe your studied water bodies more? (17 responses)

- Exploring the capabilities of SWOT in small lakes
- Study the scattering phenomena of open water and water including emergent vegetation
- Interested in reservoir operations and sedimentation, and rivers and their floodplains (including wetlands)
- Dynamics of water extent, water height and volume, and their relation to rainfall variability. Improve their parameterization hydrological models.
- Large scale lakes/reservoirs; water budget terms of these lakes/reservoirs
- Natural freshwater lakes
- All lakes connected to large rivers in SWORD
- Tibetan Plateau, including wetland lakes and glacial lakes
- Water bodies in Canada / Regional studies in Canada and large lakes (2 responses)
- lakes that are ice-covered
- Hydroclimatology of tropical water bodies
- rivers and lakes in Germany and Switzerland
- Water bodies in Central Europe inland (Rhine and lake/reservoirs in CH) and at the coast
- Saline Lake Urmia and nearby wetlands and reservoirs for basin-scale sustainable water management
- Shallow and ephemeral lakes and reservoirs in West Africa

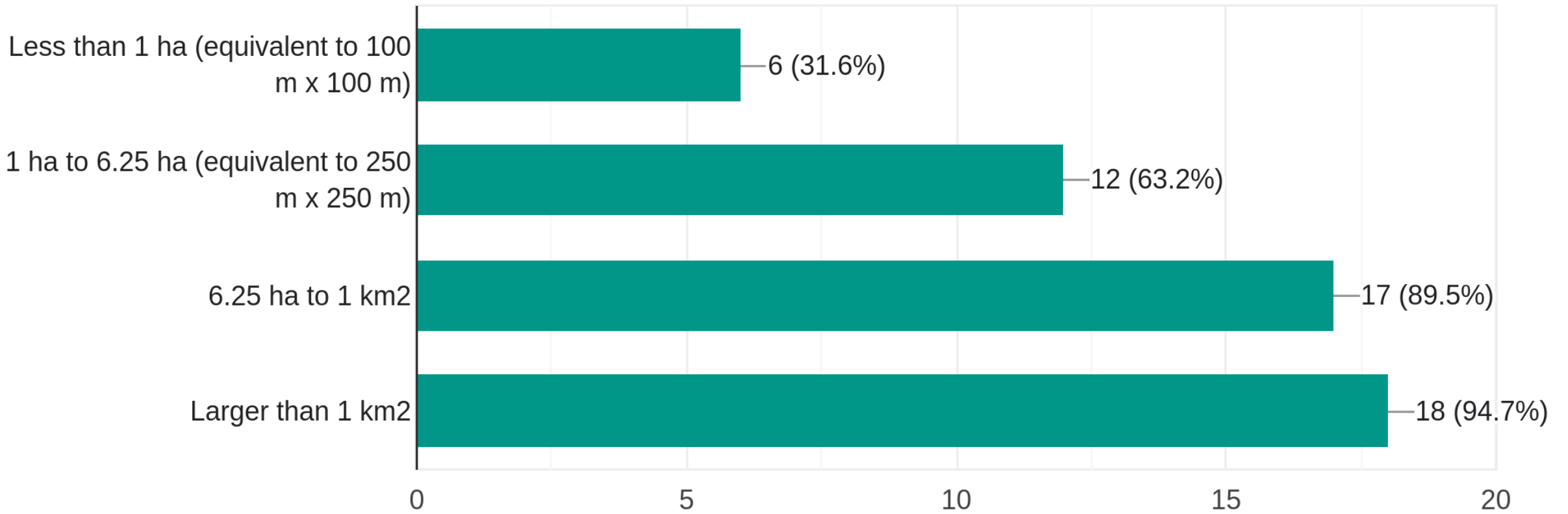
## Which SWOT data products are you using? (Check all that apply)

19 responses



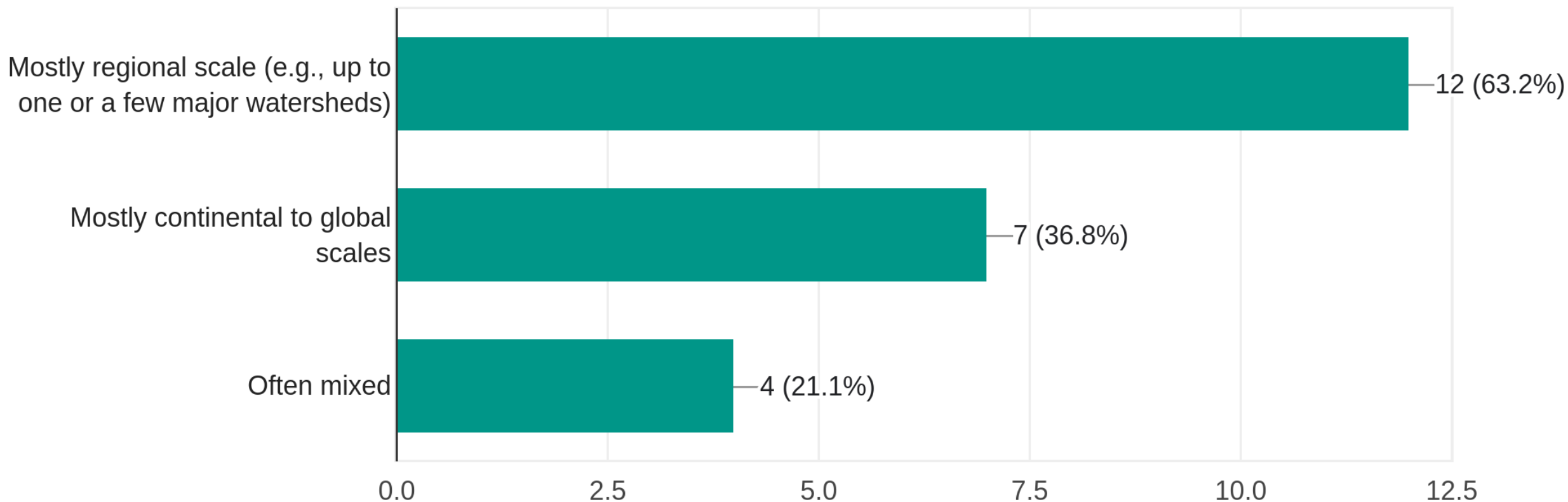
What is the size of the lakes, reservoirs, or other objects you are assessing using SWOT data?  
Please check all that apply.

19 responses



# What is the scale of your work? Check all that apply.

19 responses



# What are the major positive features that you have found in the SWOT data? (16 responses)

- Spatially distributed water elevations (monitor lakes, rivers, wetlands simultaneously)/Data everywhere / Beautiful PIXC data for the most part, great time series utility (was an initial worry) / 1) Comprehensiveness, if accurately calibrated, 2) accurate identification of most of the permanent water bodies, 3) a lot of potential unprecedented uses for Unassigned / Coverage is full, height of the lakes is right also in the case of nearby lakes at different latitudes (this was not always granted in Sentinel-3 using the OLTC tables)
- Version C is definitely improved over small lakes / unexpectedly good accuracy and precision over small areas. Surprised to get so much backscatter signal over wet lake banks (soil) -> potential direct banks DEM generation / WSE trend well represented, high potential of capture small water bodies / lots of small lakes / High spatial resolution -> analyses on finer-scale features, i.e. detecting narrow rivers and small lakes, especially small transient water features
- WSE of wetland lakes and ponds were also successfully retrieved by SWOT / Very accurate WSE / Accurate water surface elevation, global coverage, connection between lakes and rivers
- SWOT retrieved the WSE of glacial lakes, fill the gap in satellite remote sensing-based assessment of natural disasters caused by glacial lakes / Possibility to detect ice
- Better than nadir SAR altimetry
- The PIXC data of large lakes accurately covers the lake surface, making area measurement possible.
- good documentation

# What are the major negative features and issues that you have found in the SWOT data? (14 responses)

- Issue with water extent / river width, extension of lakes do not correspond with expectation from DTM in well monitored regions sometimes / Accuracy of inundation extent / Reservoirs fragmented and missing areas, Incorrect classification, Geospatial dilocation of features / Bright lands (overdetection of water over lake banks), pixel geolocation errors (mostly pixels classified as "dark water") possibly mixed with phase unwrapping errors, and specular ringing / Nadir Ringing specially in lakes partially observed / 'specular ringing' effect particularly challenging, geolocation abnormalities require more attention / the water surface in lake perhaps not correct, river width can be problematic / Dark water, specular ringing / 7) Nadir noises
- Concern on reliability of the higher data products (LakeSP, RiverSP), a little less on quality for lower-level products (PIXC) / The raster product does not show the same as the PIXC / 2) inconsistency of the formats of some products (basic layers) with mains GIS- software
- No access to the Release Note, please check and improve / 1)Complexity of the usage and existing guidelines (full of Jargons), though the recent documents are much better
- PLD datasets still need to be improved, especially for small lakes / 6) Issues with the extracted PLDs that propagates in the other products. Exclusion of available national databases and local knowledge to improve the accuracy of data (e.g., boundaries, bathymetry, structures, Names)
- Layover effect causes the WSE of some pixel clouds to be wrong, and these pixel clouds are even flooded near correct pixel clouds
- The low roughness of the water surface leads to weak radar return signals, resulting in incorrect WSE. This situation usually occurs in small wetland lakes and ponds.
- Still a lot of noise including georeferencing errors
- Lack of publicly available standard cal/val protocols for assessing the product using in situ data for various type of waterbodies, 4) Lack of a comprehensive report on the results of cal/val for the pilot lakes
- Geoid issues over large lakes that affects accuracy of WSE
- Issues with the impact of natural barriers (islands, evaporites) and hydraulic structures in the water bodies on WSE.



# What could be done to the SWOT data in future reprocessing to improve the quality of your science? (14 responses)

- water classification, height clusters / Improve river width and extension / For the West African water bodies we study, we believe that the inclusion of "water near land" pixels in the LakeSP product calculation will almost systematically lead to overdetection of water / Better water detection and classification
- Modification of the PLD for riparian wetlands, modification of the PLD for large lakes (several lakes are grouped together in the same LakeID) / Correction of some PLD miss delineation specially in flat tropical areas
- Develop a ice flag directly from SWOT outputs / Creating an ice flag for the lake features
- Added layover flag and sigma0 flag filtering for pixel cloud
- How to deal with outliers ; bad detection of water
- PIXC processing could be an issue, revise selection

# What are some of the new sciences you are revealing or excited about revealing from SWOT data? (16 responses)

- Comprehensive seasonal changes in lakes.
- Monitoring natural disasters caused by glacial lakes / analysis of lake ice dynamics / Really interested in the cryosphere applications for lakes/SWOT
- Lake/reservoir water balance; reservoir operations / the regional assessment of lake storage changes
- Regional scale estimates of hydrological connectivity / fluvial connectivity between lakes and open water wetlands and to what extent in scale are we able to identify it
- Reservoir sedimentation, edges of river floodplains, geomorphic functions across rivers and their floodplains
- Mapping the major Amazon drought, providing lowest water level ever recorded ; flood in South Brazil mechanisms; Lakes evolution in tropical environment
- Analyzing the hydrological functioning and estimating the water volume changes of lakes and reservoirs in West Africa at an unprecedented spatial scale
- Lake surface phenomenology
- Show off SWOT's sensitivities to wind speed, vegetation structure, foliar moisture, and surface soil moisture-- and the possibilities of developing new algorithms to support SWOT's goal of studying surface water variability.
- When comparing the water-masked polygons with high-resolution optical images, water quality issues like algae bloom that changes the lake color might interfere
- high potential of Unassigned Lake SP SWOT data to monitor illegal water abstractions for small-scale farms.
- Improve geoid over (big) lakes