

## Input data for making the change images (location, and dates for pre- and post-event periods)

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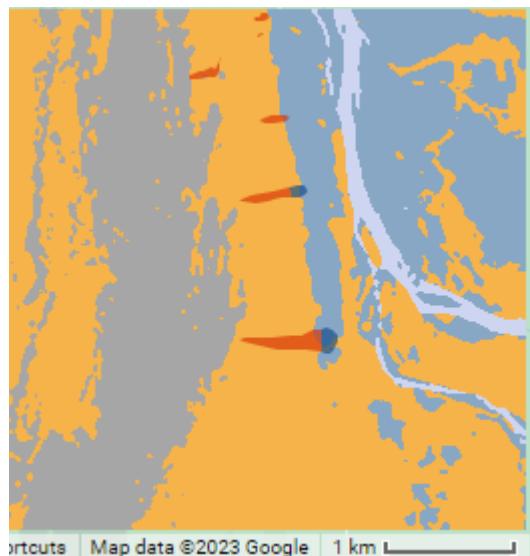
## Map of case studies



<https://code.earthengine.google.com/6b54158516fc8dba85a6239883b3a67b>

# 1. Iceland <https://code.earthengine.google.com/0675963575387578536f498cc119011c>

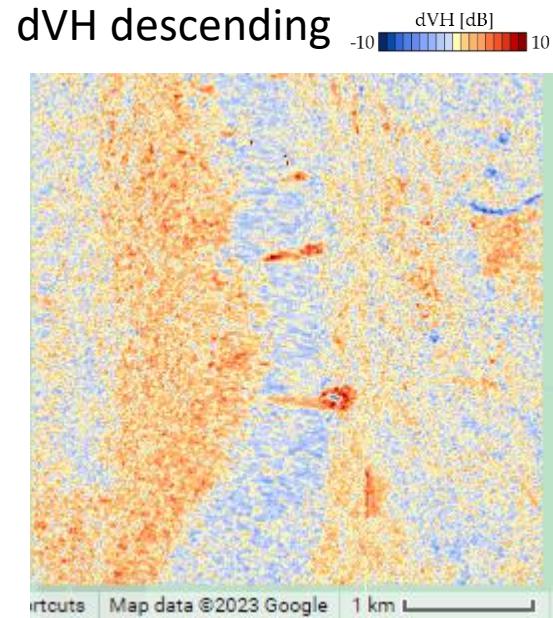
Landcover and polygons



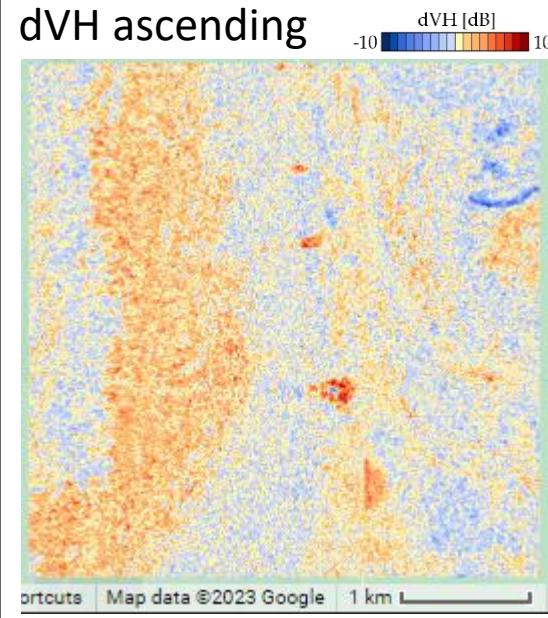
dNDVI



dVH descending

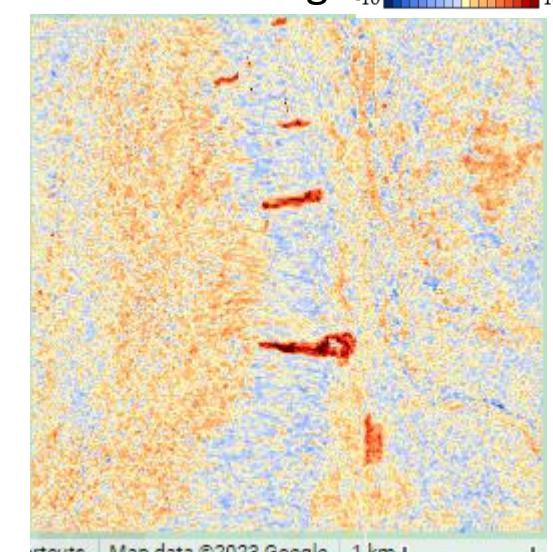


dVH ascending

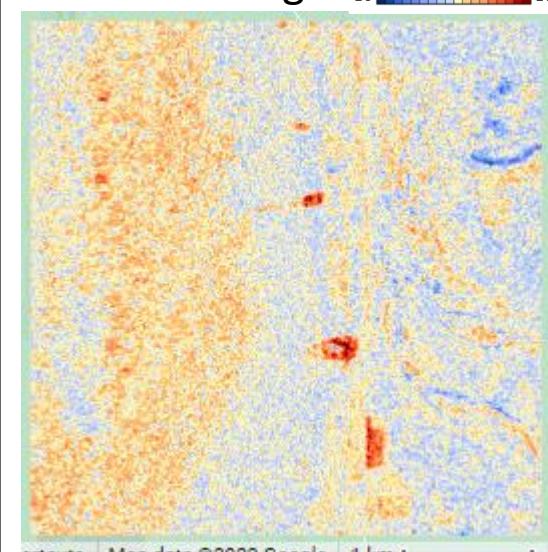


One of the landslides at Þingeyjarsveit in Iceland. [Image from a drone video uploaded to YouTube by Islandstrasin](#).

dVV descending



dVV ascending

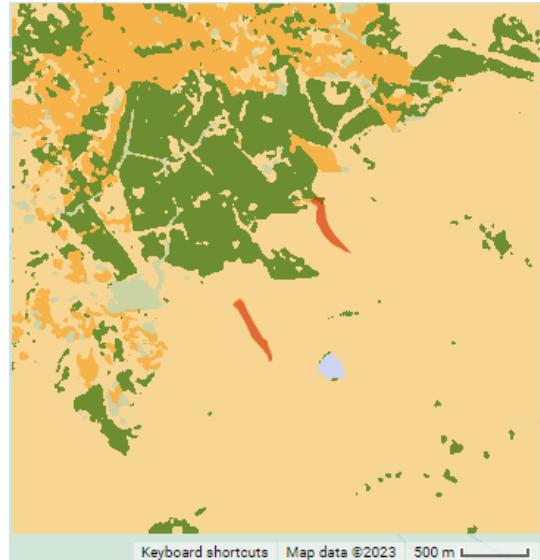


<https://blogs.agu.org/landslideblog/2021/10/08/multiple-landslides-in-thingeyjarsveit-and-in-kinnarfjoll-in-iceland/>

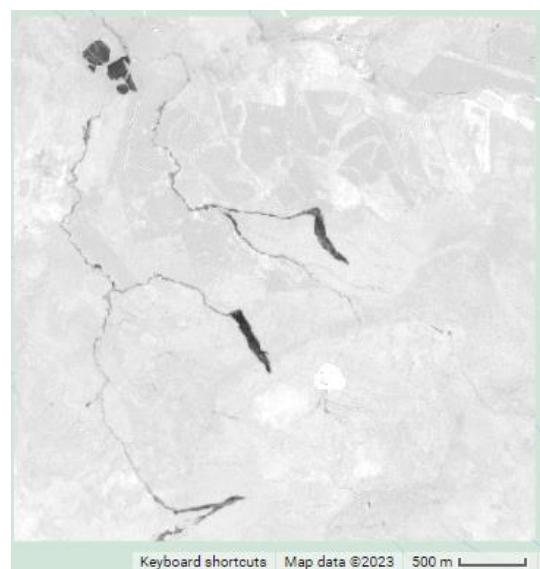
- █ Urban, artificial
- █ Forest, trees
- █ Sparsely vegetated
- █ Agriculture, grass
- █ Scrub, herbaceous
- █ Wetland
- █ Water body, sea
- █ Bare rock, bare soil
- █ Glacier, snow

## 2. Ireland <https://code.earthengine.google.com/f3d20fa30d14113582bf0050ce5d5e15>

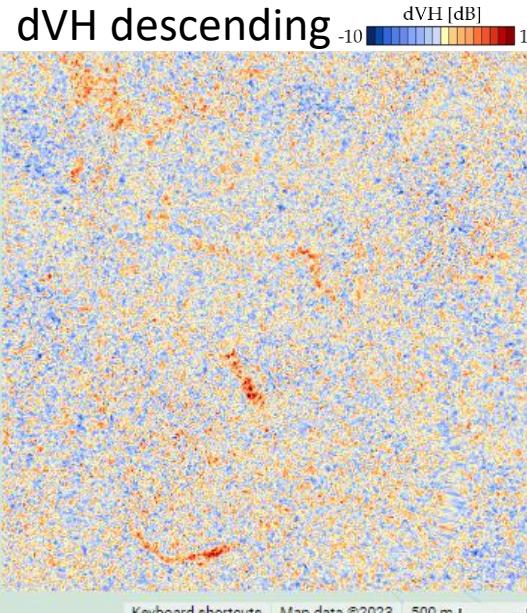
Landcover and polygons



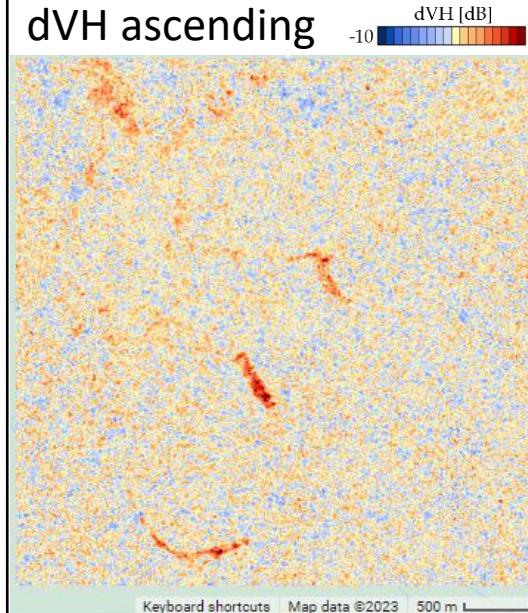
dNDVI



dVH descending



dVH ascending



The landslide apparently occurred on 4 July 2021 during heavy rainfall. The landslide was photographed by a trekking enthusiast.



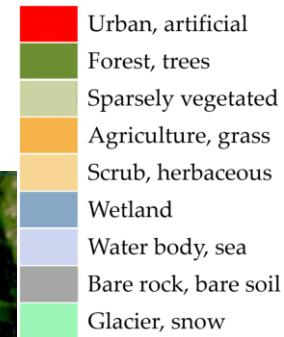
The peat landslide at Benbrack in Ireland. [Image by Kevin Dockery via The Anglo-Celt](#)

<https://blogs.agu.org/landslideblog/2021/07/23/benbrack-1/>

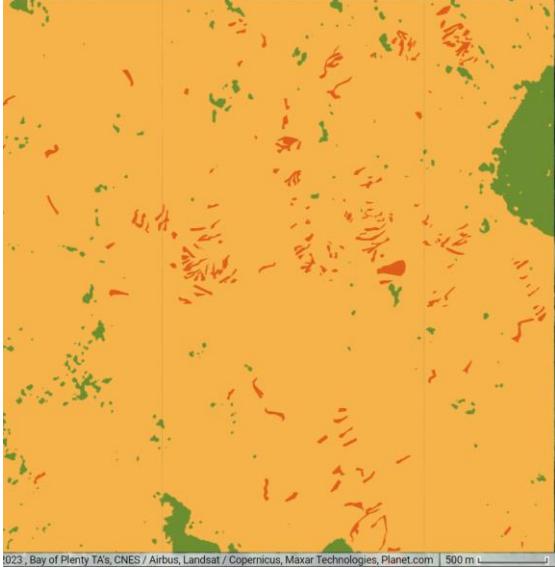
- █ Urban, artificial
- █ Forest, trees
- █ Sparsely vegetated
- █ Agriculture, grass
- █ Scrub, herbaceous
- █ Wetland
- █ Water body, sea
- █ Bare rock, bare soil
- █ Glacier, snow

### 3. New Zealand

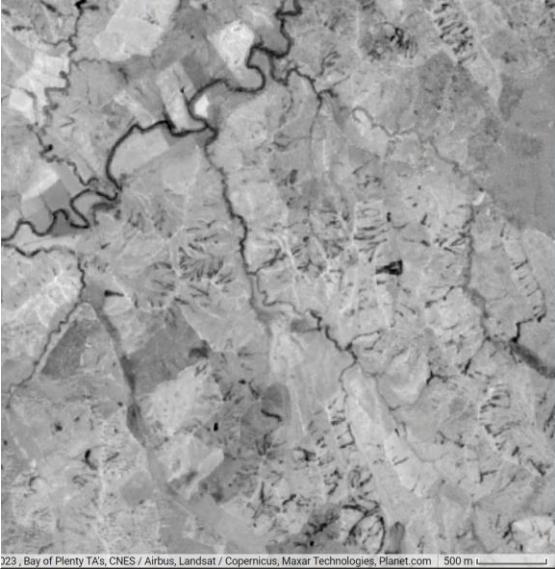
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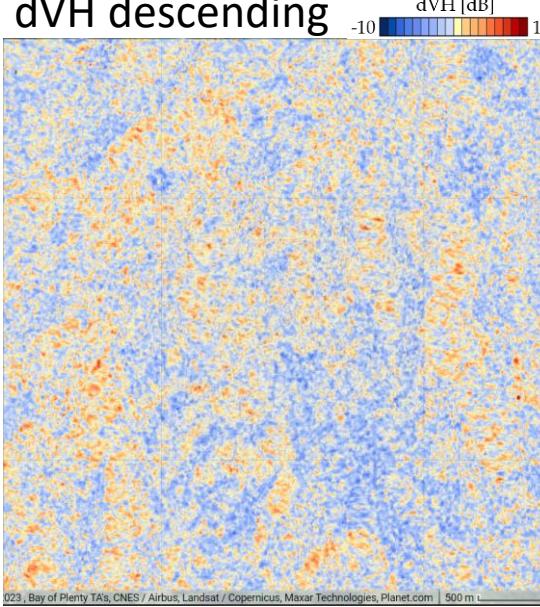
Landcover and polygons



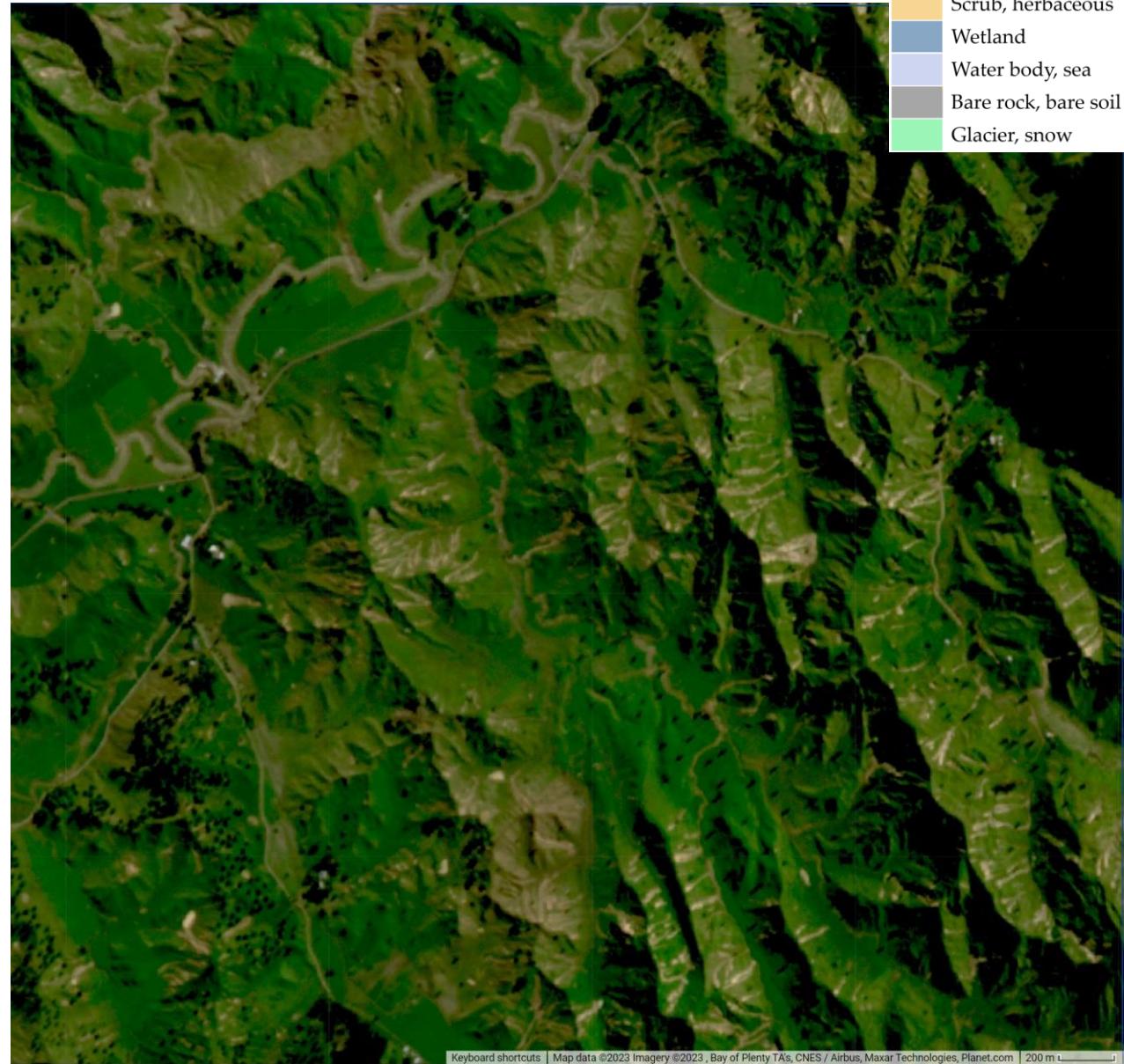
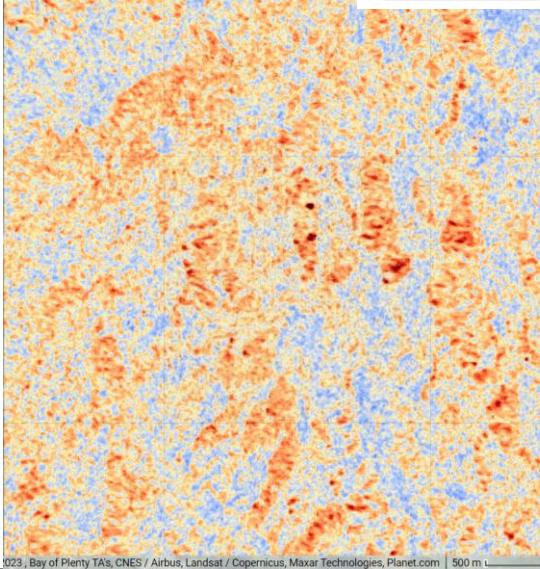
dNDVI (Planet)



dVH descending

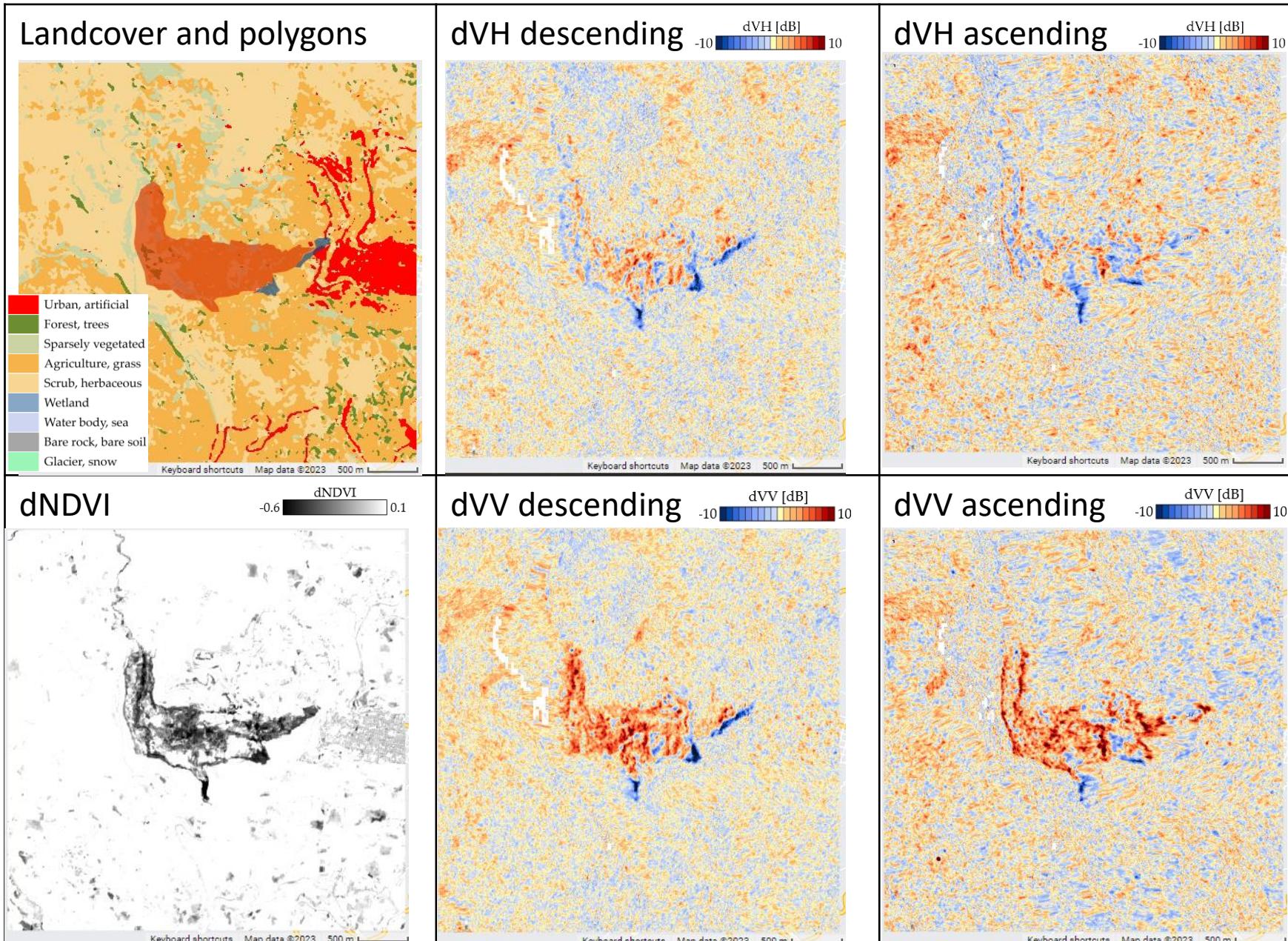


dVV descending



#### 4. Ecuador

<https://code.earthengine.google.com/a1968b3aec8576ad3b28c3ec4e4bacf>



<https://www.youtube.com/watch?v=gsndBqxLkJo>



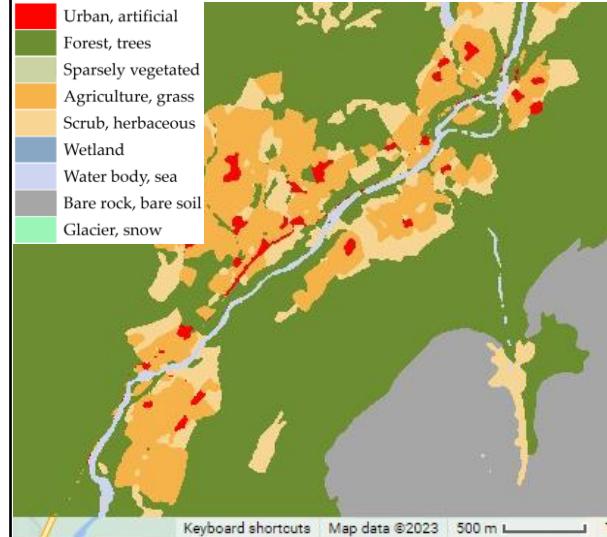
The Chunchi landslide in Ecuador. Image by Riesgos via [Primicias](#).

[https://blogs.agu.org/landslide\\_blog/2021/02/16/chunchi-a/](https://blogs.agu.org/landslide_blog/2021/02/16/chunchi-a/)

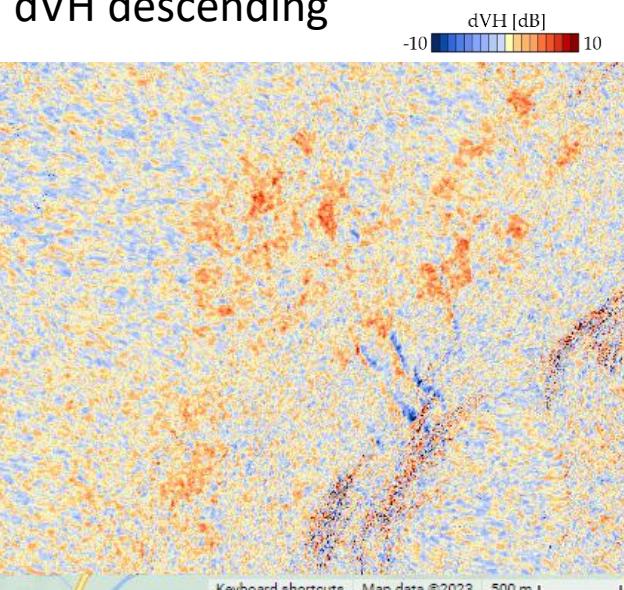
## 5. Norway

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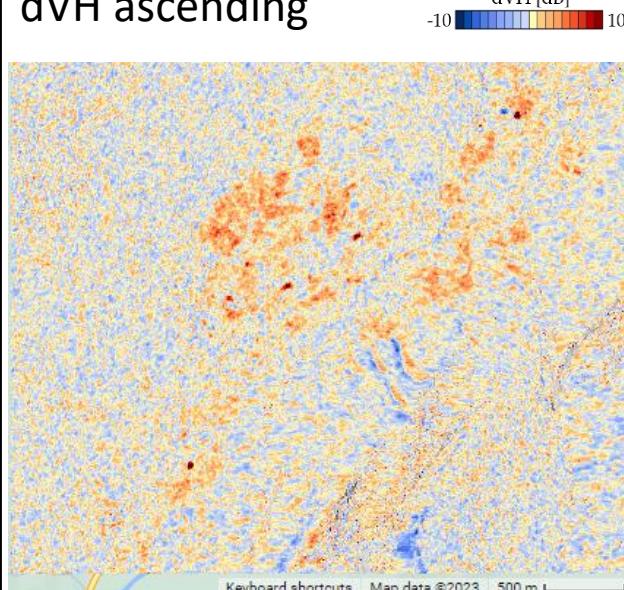
Landcover and polygons



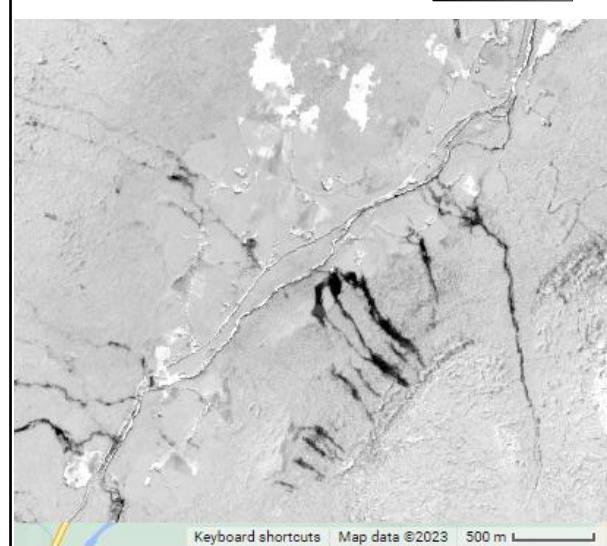
dVH descending



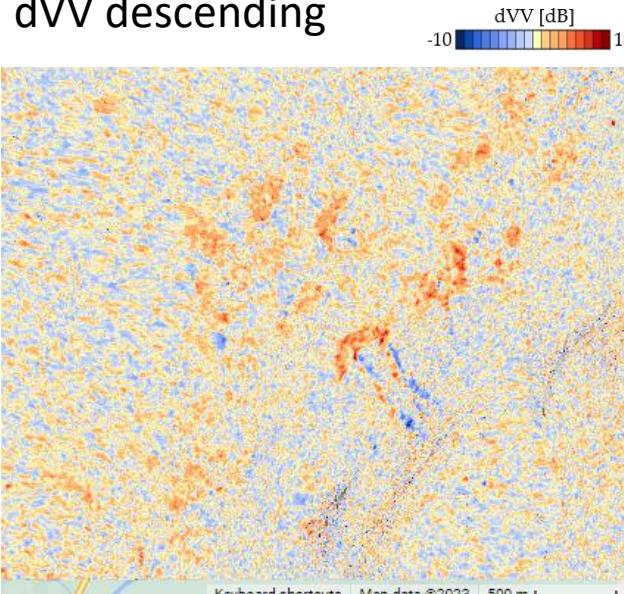
dVH ascending



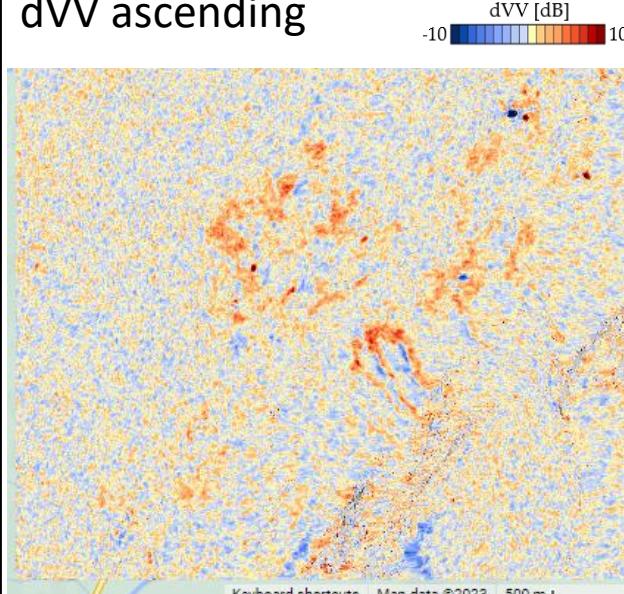
dNDVI



dVV descending

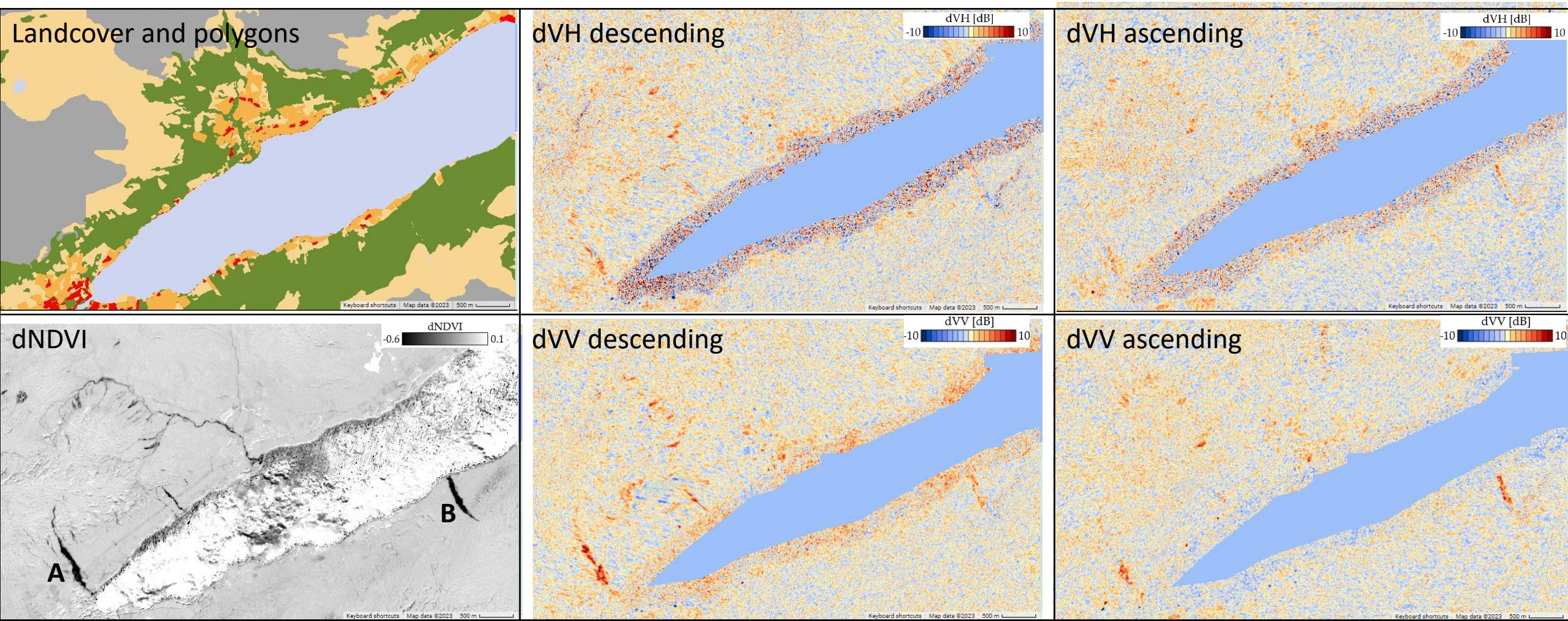
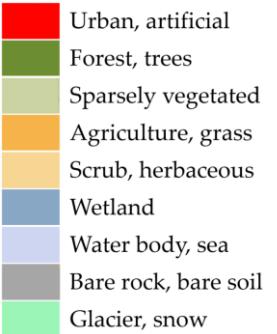


dVV ascending



<https://www.bt.no/nyheter/lokalt/i/pLIEQ1/familien-hoerte-det-buldre-i-fjellsiden-saa-kom-raset-mot-dem>

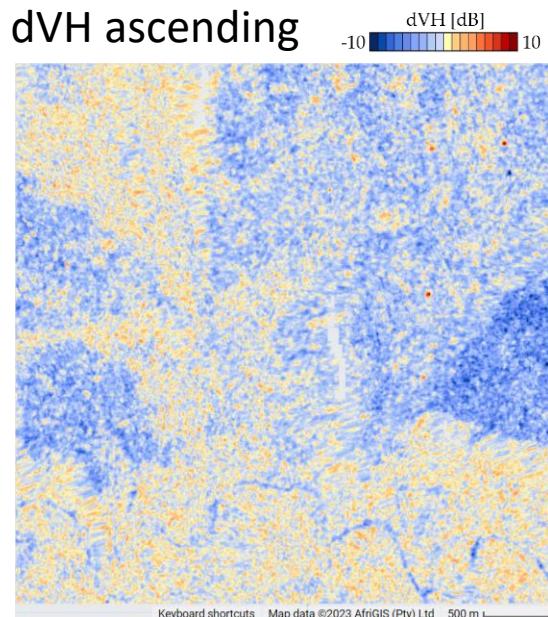
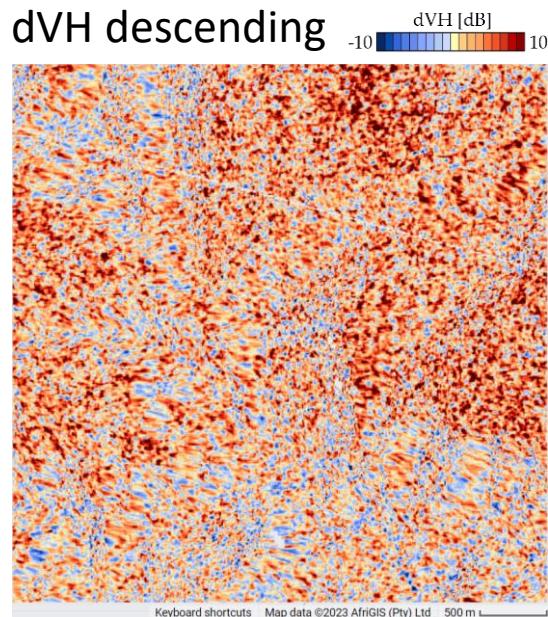
## 5. Norway, continued...



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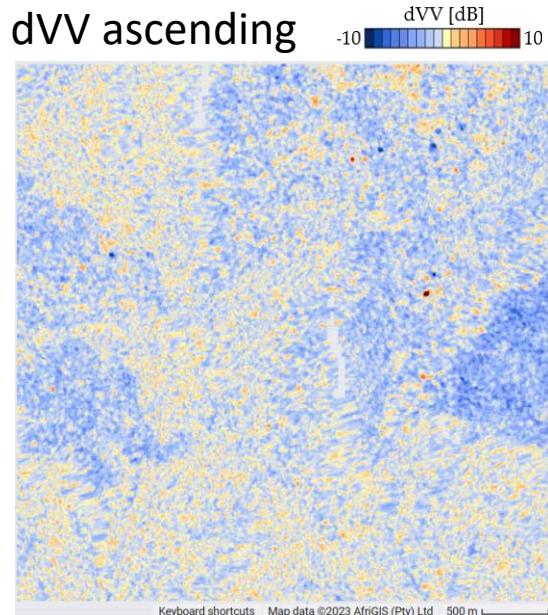
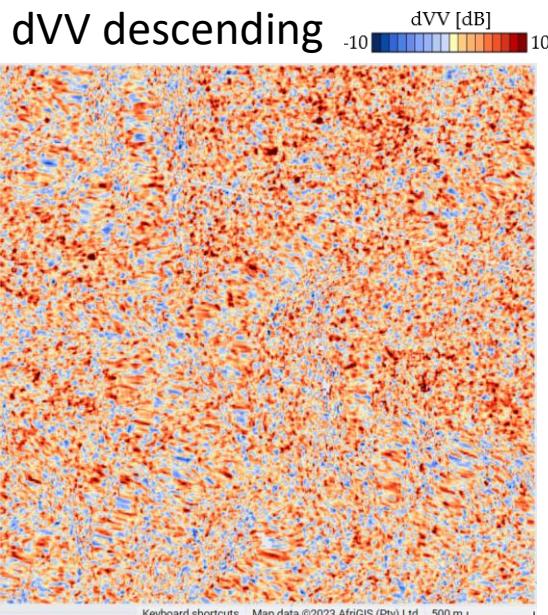
NOT INCLUDED IN  
STATISTICAL ANALYSES

Landcover and polygons



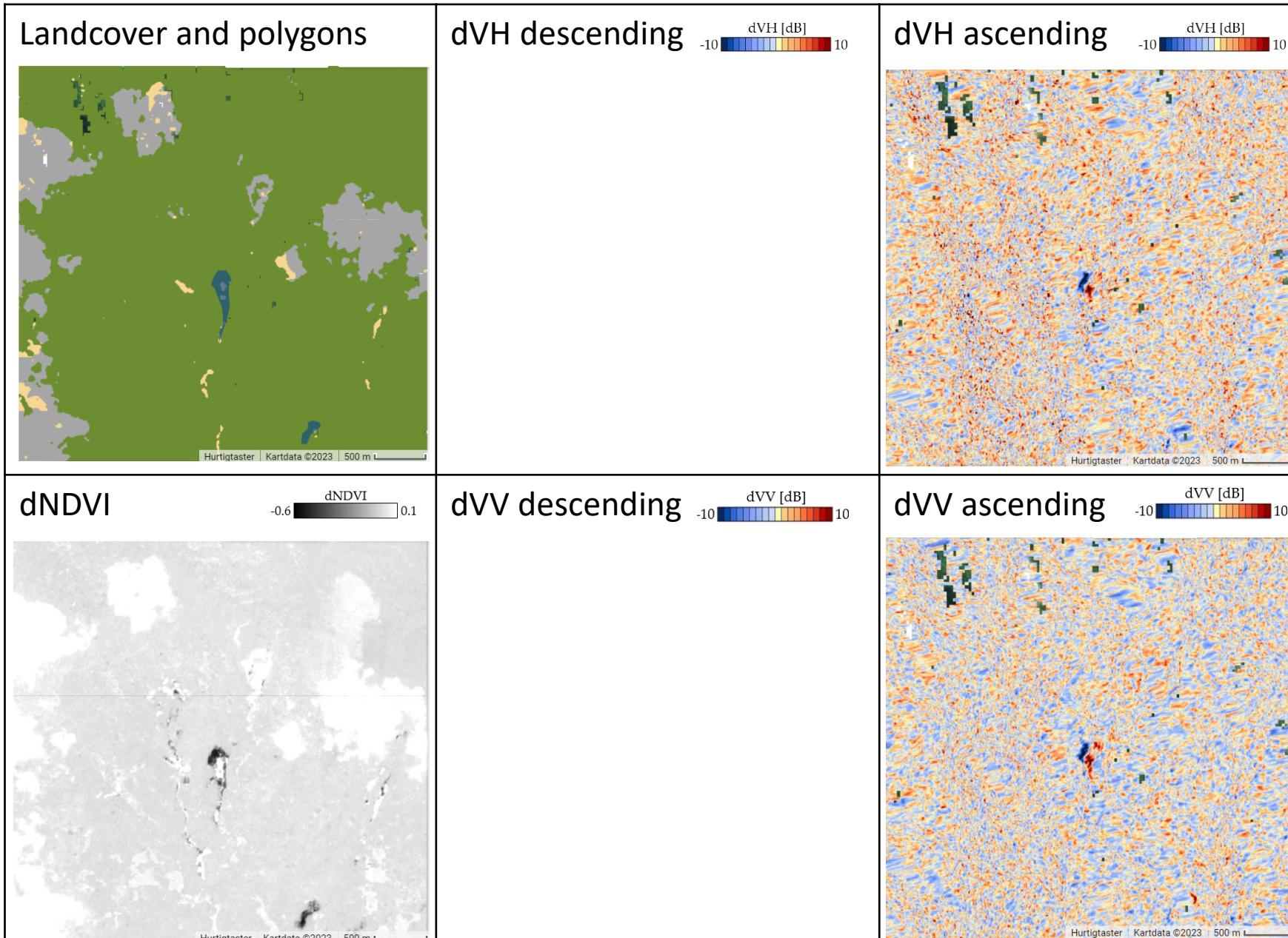
dNDVI

dNDVI  
-0.6 0.1



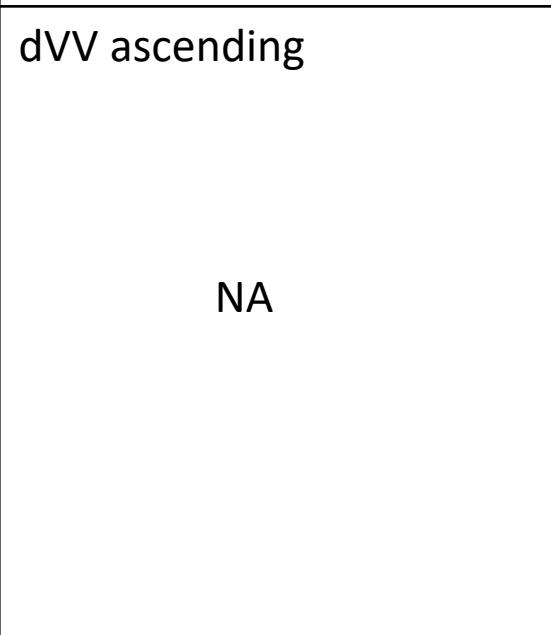
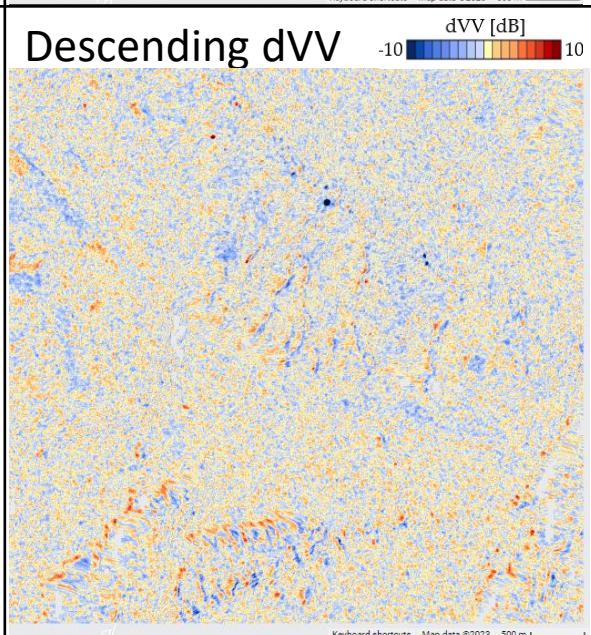
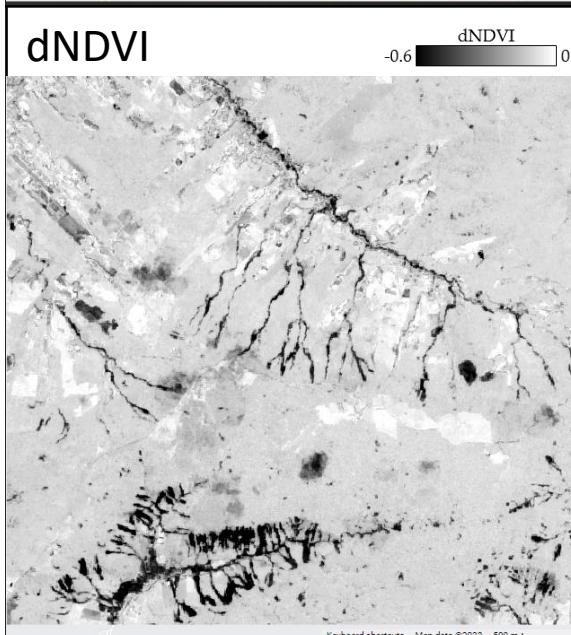
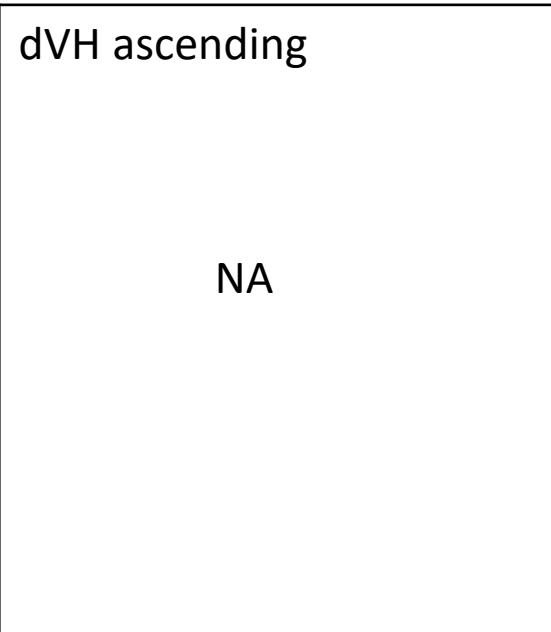
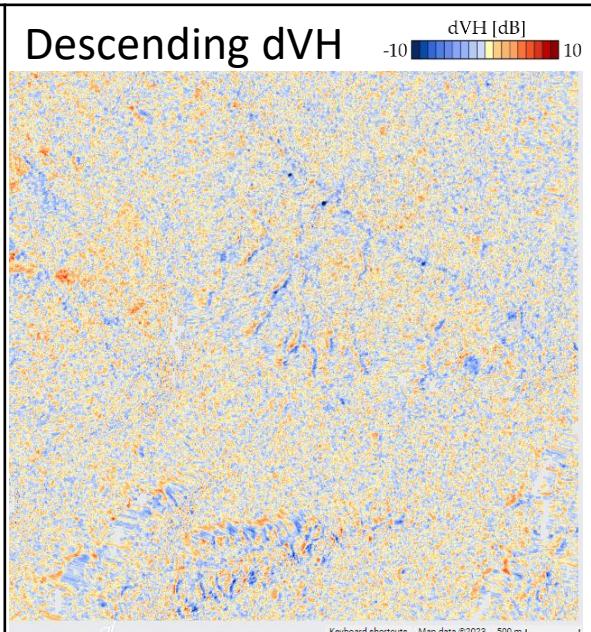
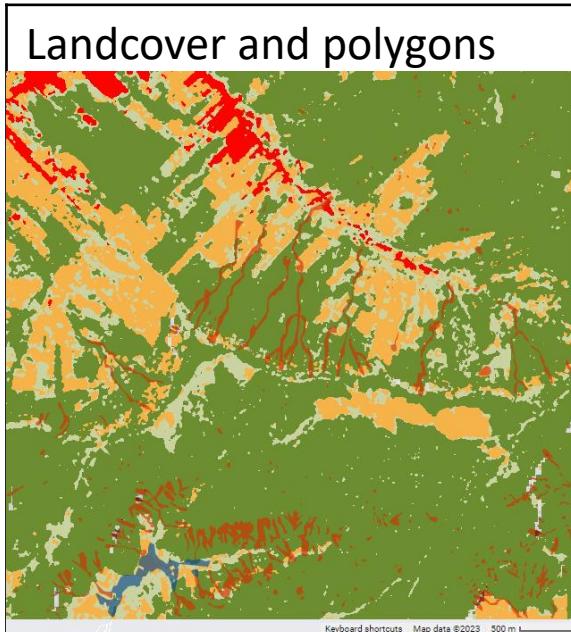
## 7. Vanuatu

<https://code.earthengine.google.com/f9468909231f355865b68f03d2e8115f>



- █ Urban, artificial
- █ Forest, trees
- █ Sparsely vegetated
- █ Agriculture, grass
- █ Scrub, herbaceous
- █ Wetland
- █ Water body, sea
- █ Bare rock, bare soil
- █ Glacier, snow

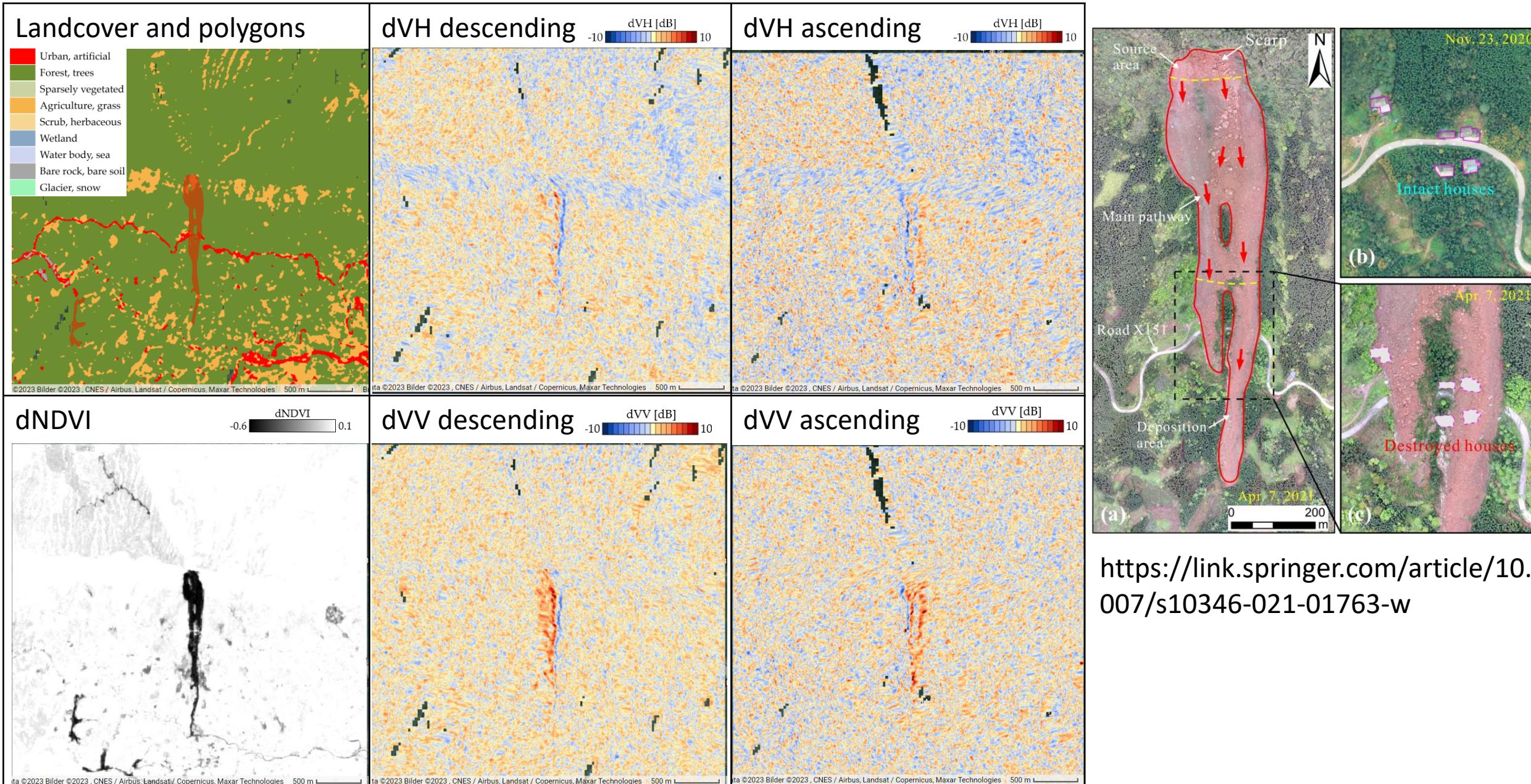
8. Brazil <https://code.earthengine.google.com/000f5a18fd9aea99d38c2ca24de2ce7d>



- Urban, artificial
- Forest, trees
- Sparsely vegetated
- Agriculture, grass
- Scrub, herbaceous
- Wetland
- Water body, sea
- Bare rock, bare soil
- Glacier, snow

## 9. China

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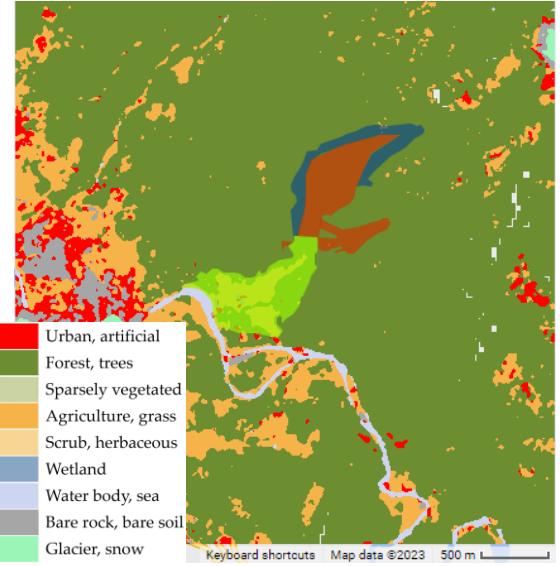


<https://link.springer.com/article/10.1007/s10346-021-01763-w>

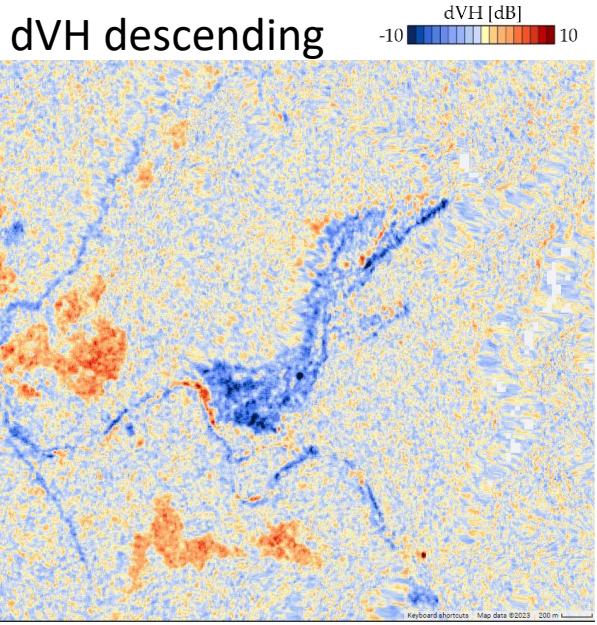
## 10. Philippines

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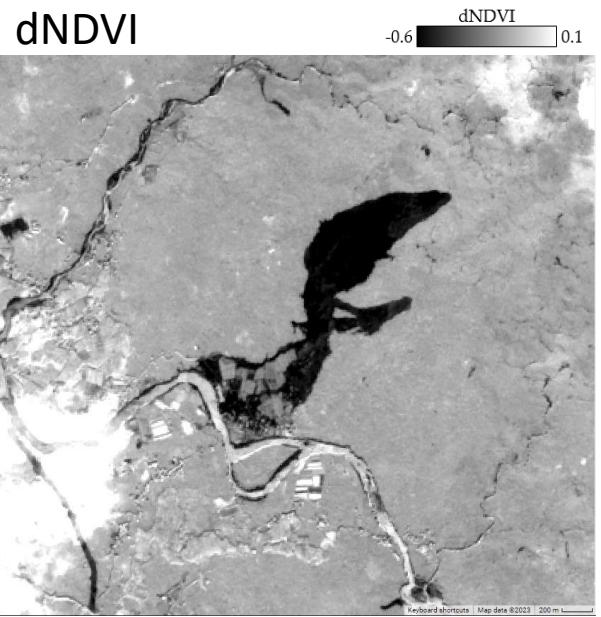
Landcover and polygons



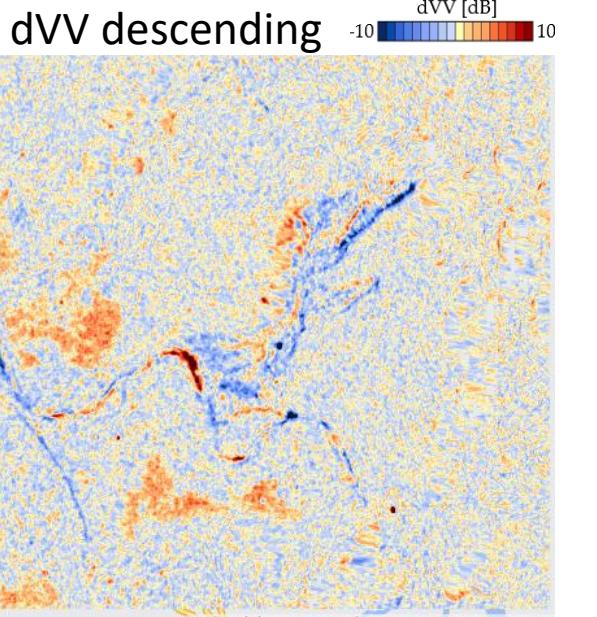
dVH descending



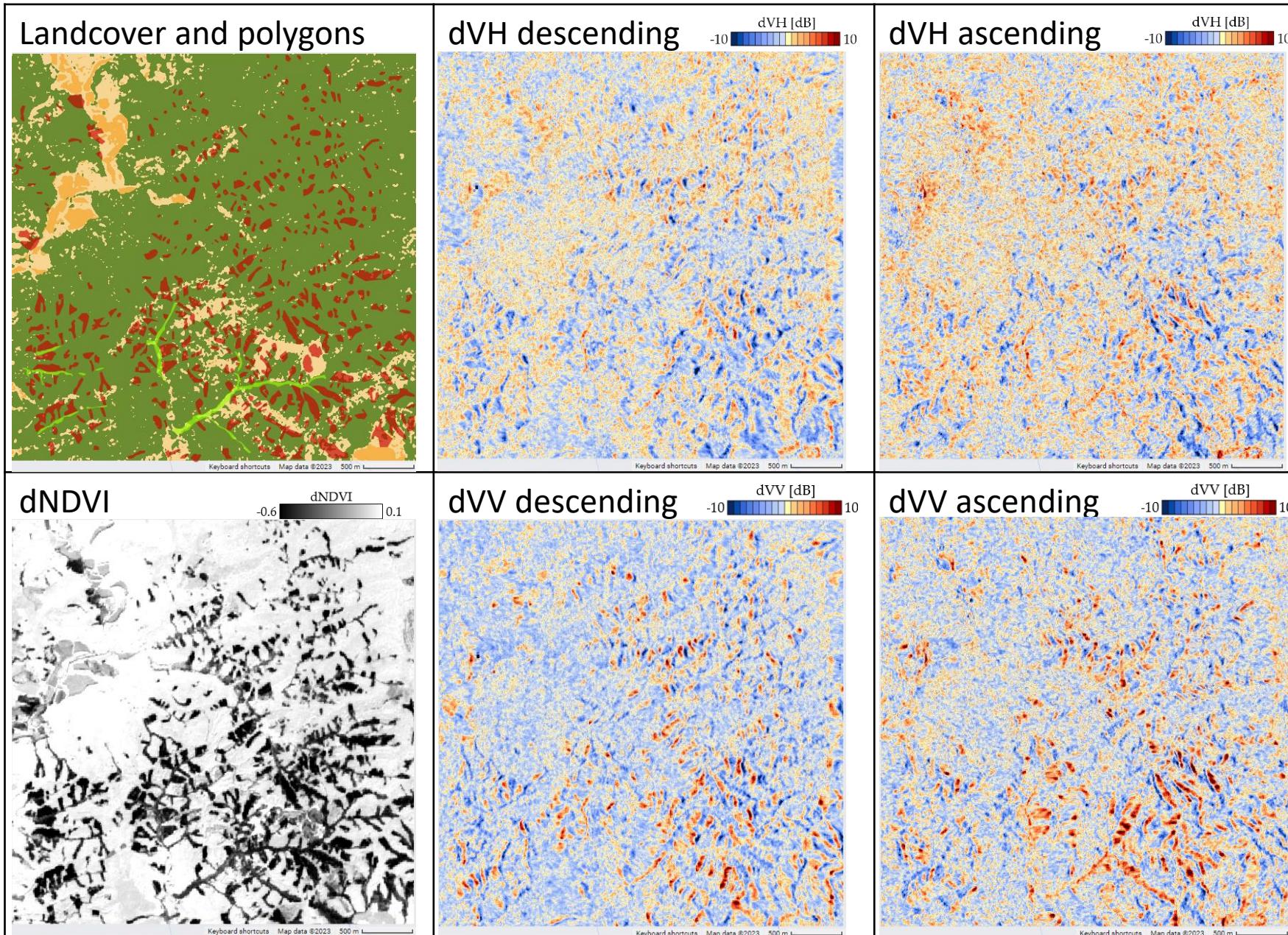
dNDVI



dVV descending

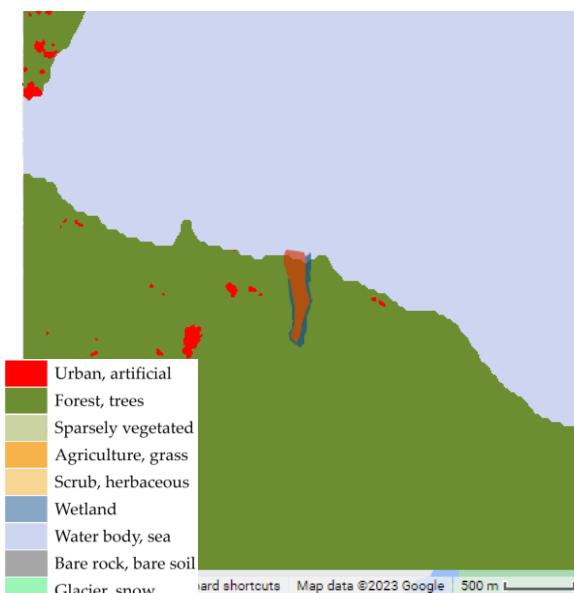


## 11. Japan <https://code.earthengine.google.com/23feed12abd5018b078a162549a5047c>

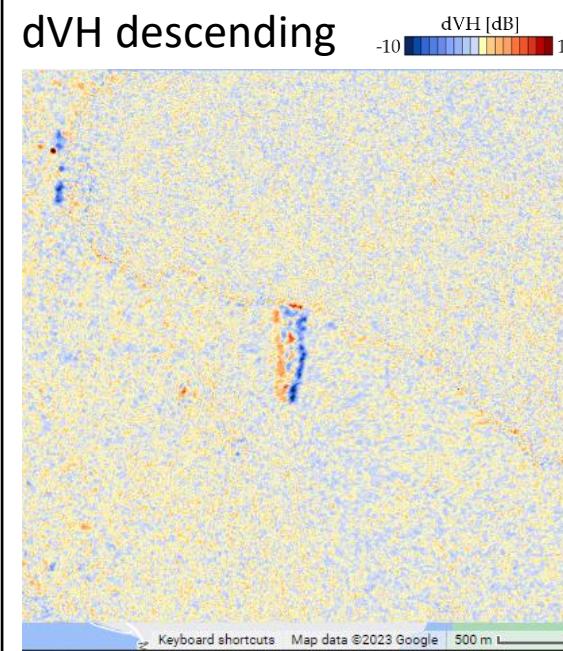


## 12.USA <https://code.earthengine.google.com/1c9582c1020233aec5485a621cee113d>

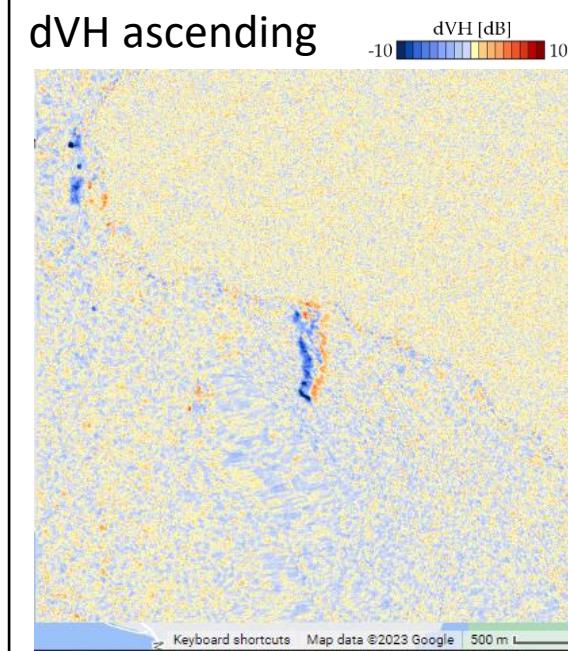
Landcover and polygons



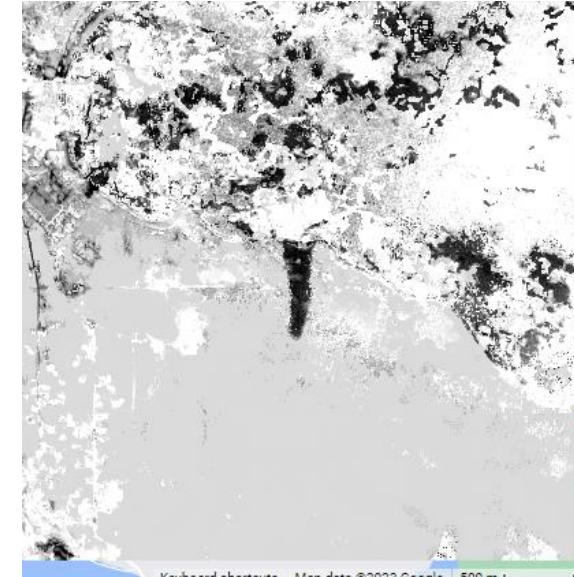
dVH descending



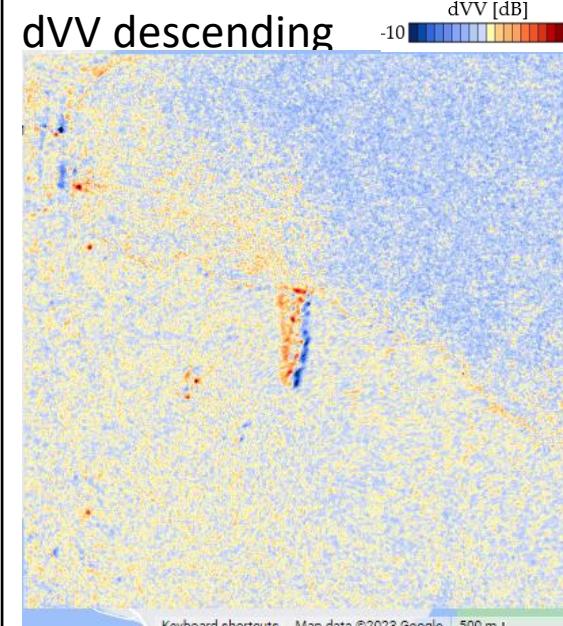
dVH ascending



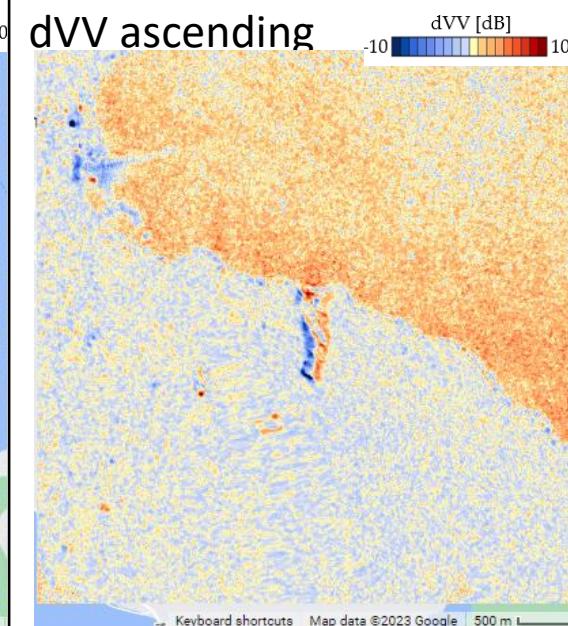
dNDVI



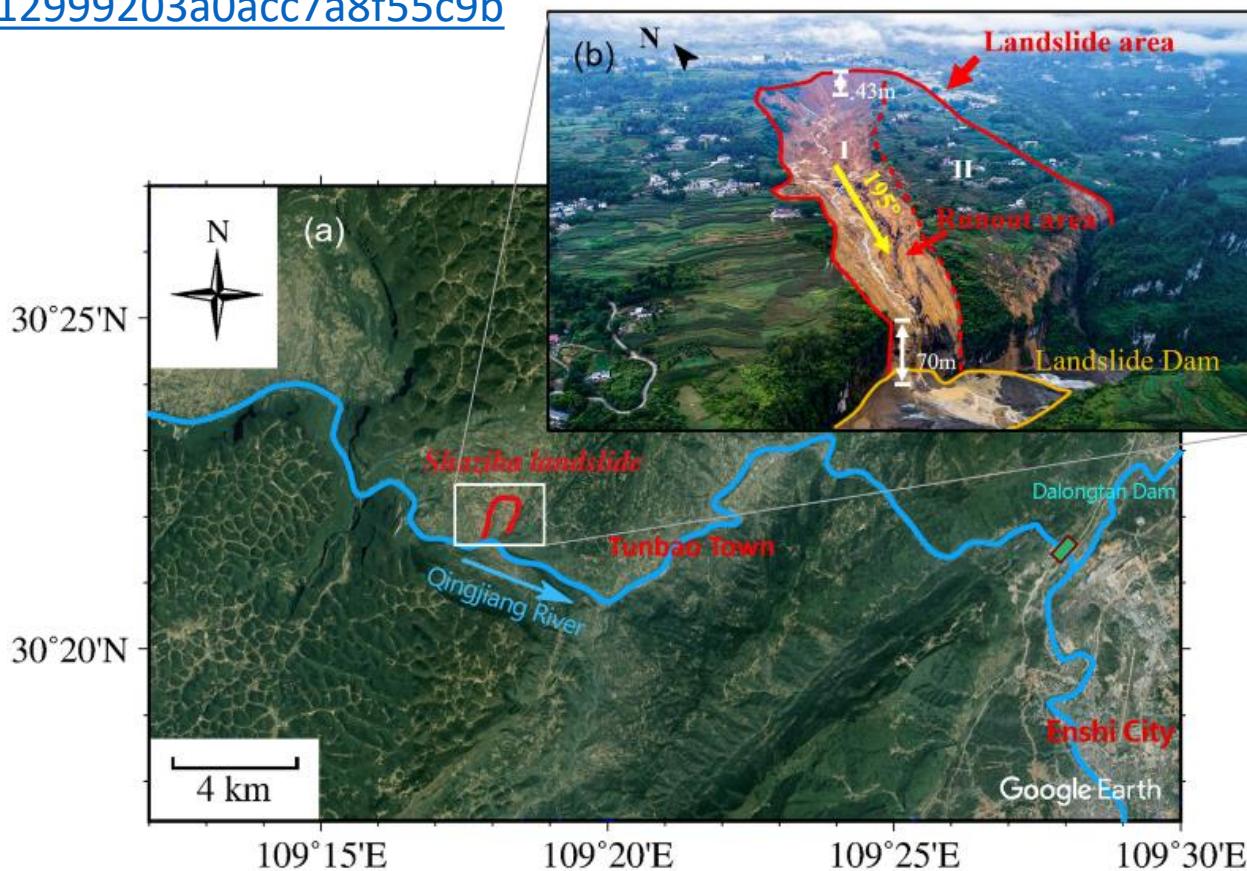
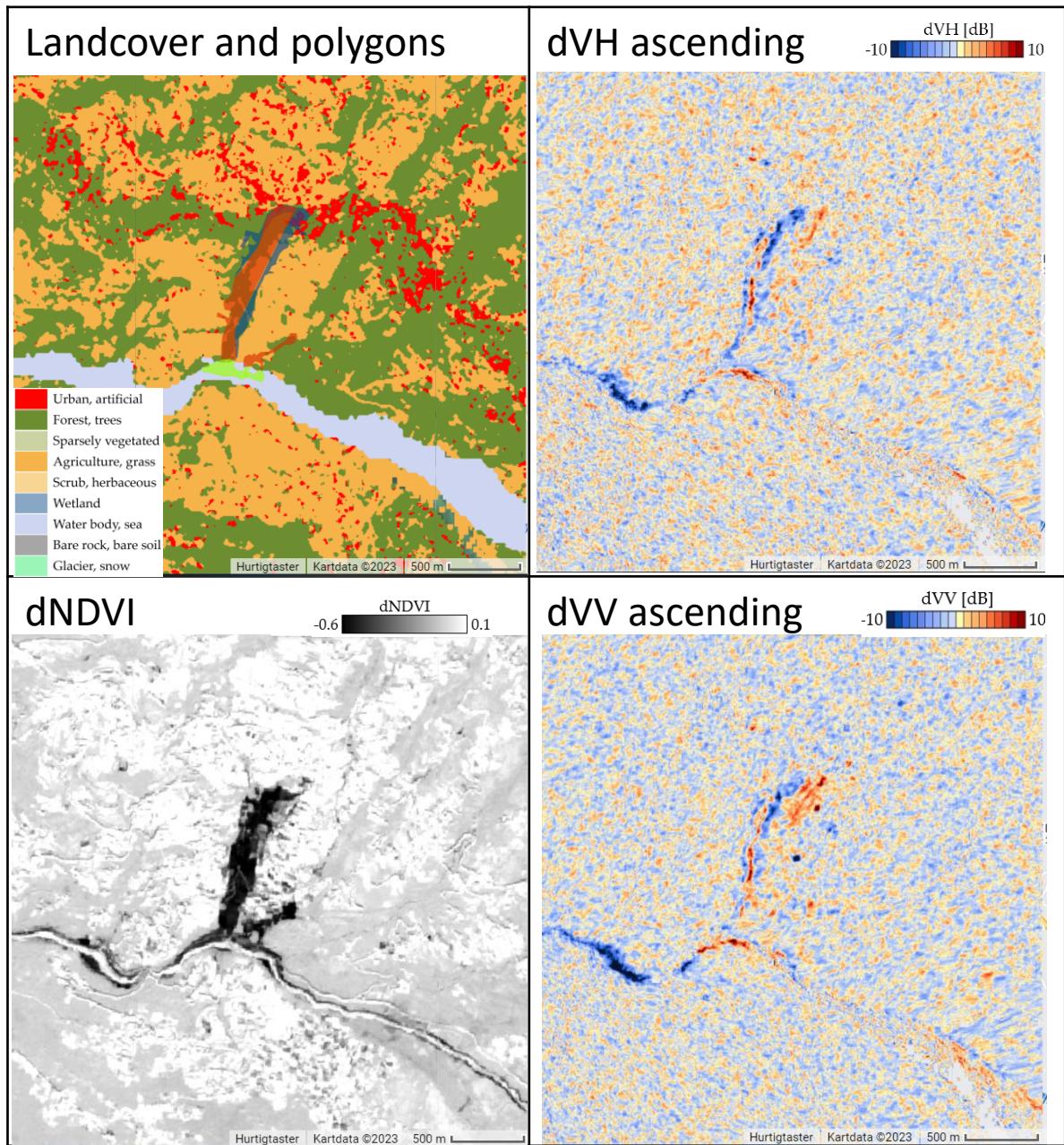
dVV descending



dVV ascending



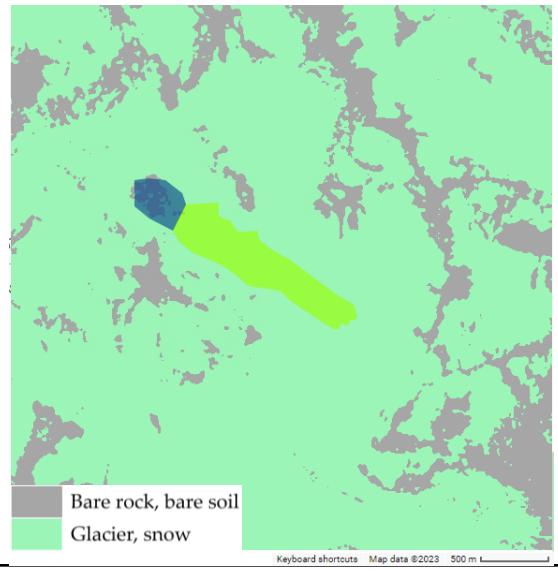
13. China <https://code.earthengine.google.com/a728c376c412999203a0acc7a8f55c9b>



<https://link.springer.com/article/10.1007/s10346-021-01782-7>

## 14. New Zealand <https://code.earthengine.google.com/b00dfb147afebb2cd2948c595070e434>

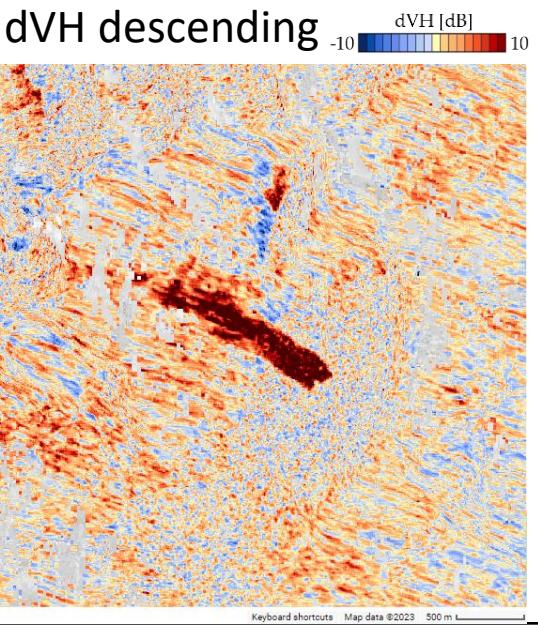
Landcover and polygons



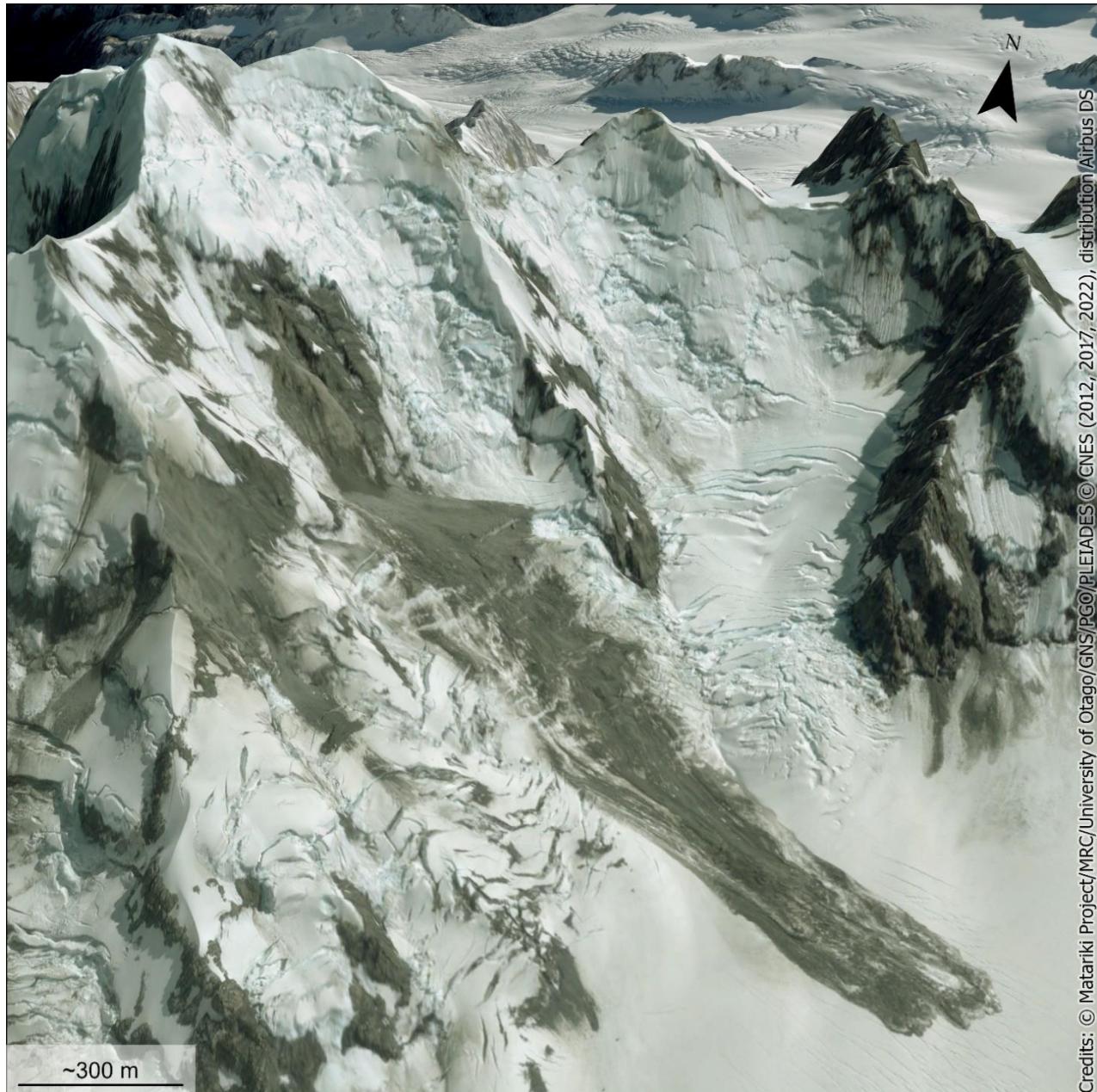
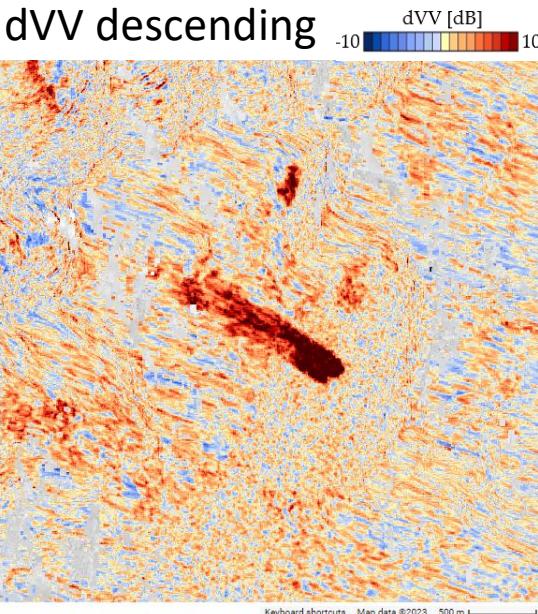
dNDVI



dVH descending



dVV descending

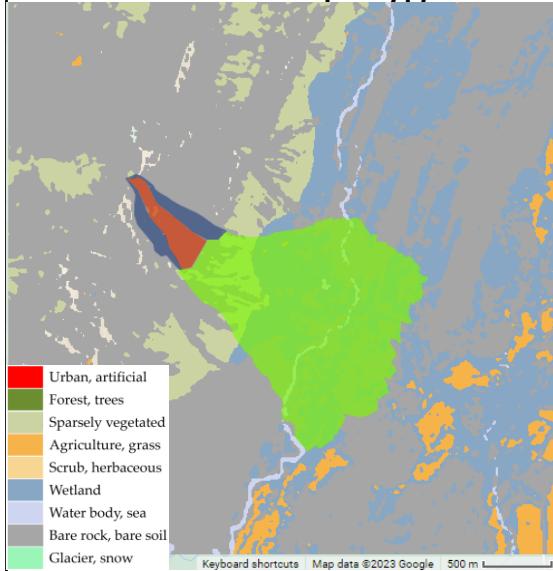


Credits: © Matariki Project/MRC/University of Otago/GNS/PGO/PLEIADES © CNES (2012, 2017, 2022), distribution Airbus DS

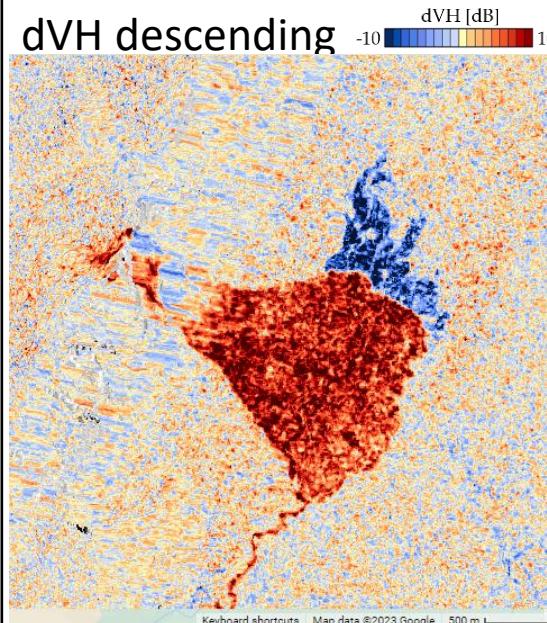
## 15. Iceland

<https://code.earthengine.google.com/aea435b8d9282d18579a8b981820f7c9>

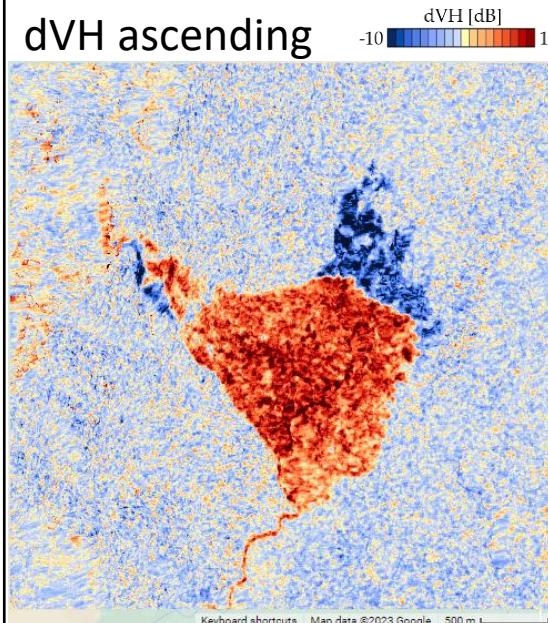
Landcover and polygons



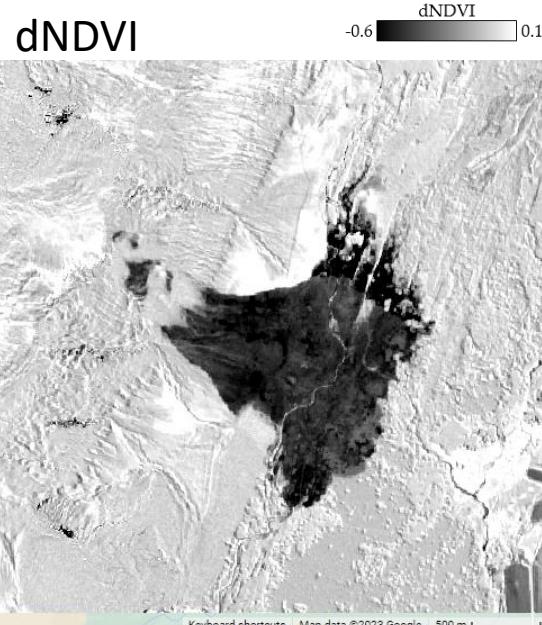
dVH descending



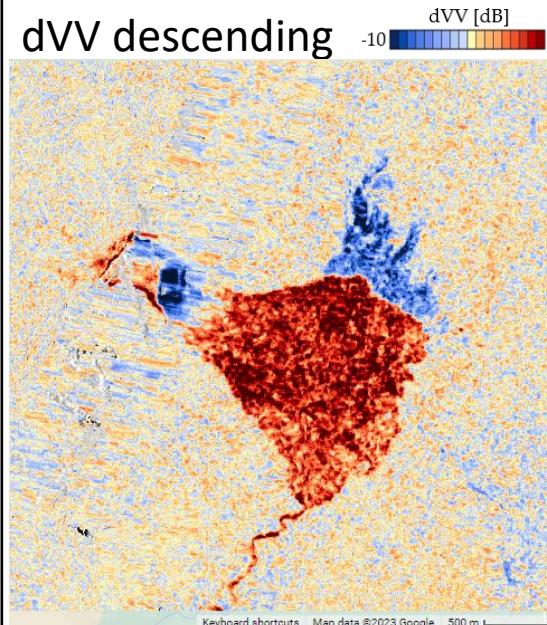
dVH ascending



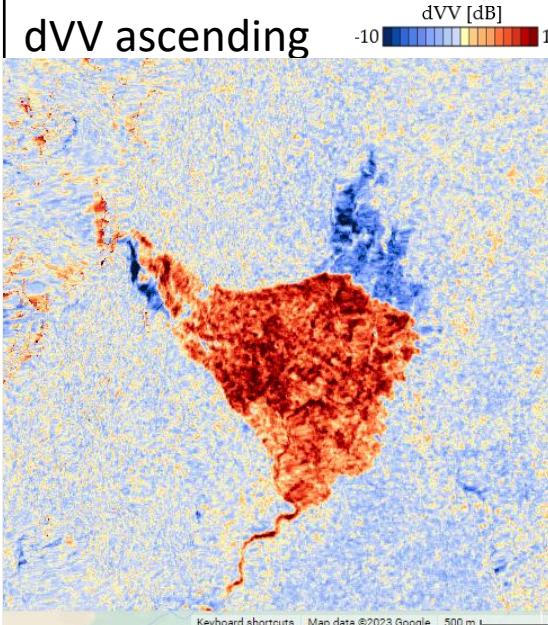
dNDVI



dVV descending



dVV ascending



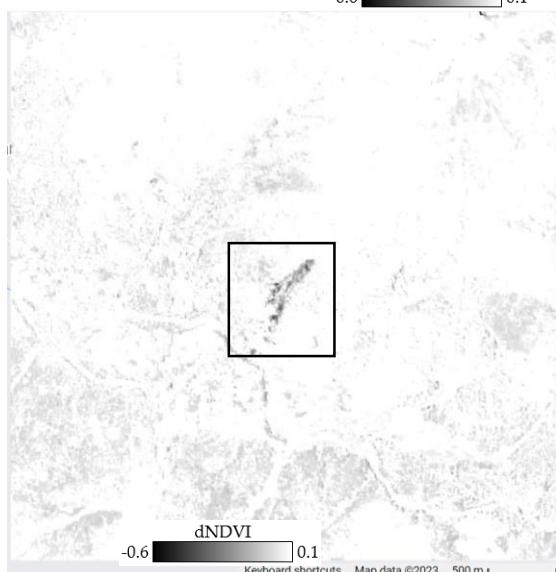
16. India <https://code.earthengine.google.com/3facf184429d229ee20fe5c737278c04>

NOT INCLUDED IN  
STATISTICAL ANALYSES

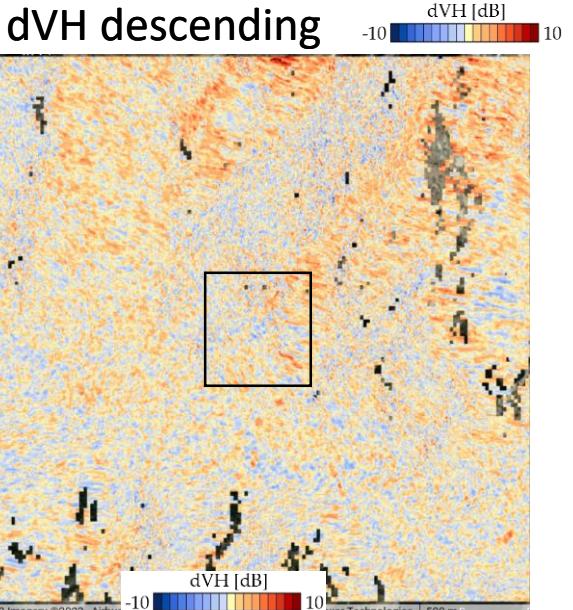
### Landcover and polygons



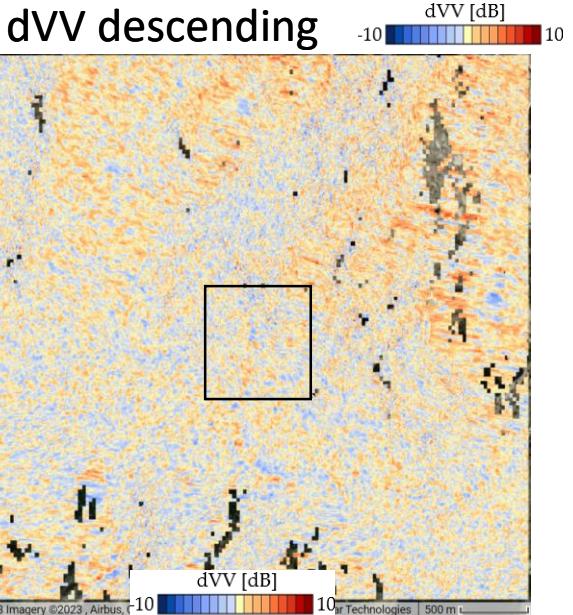
### dNDVI



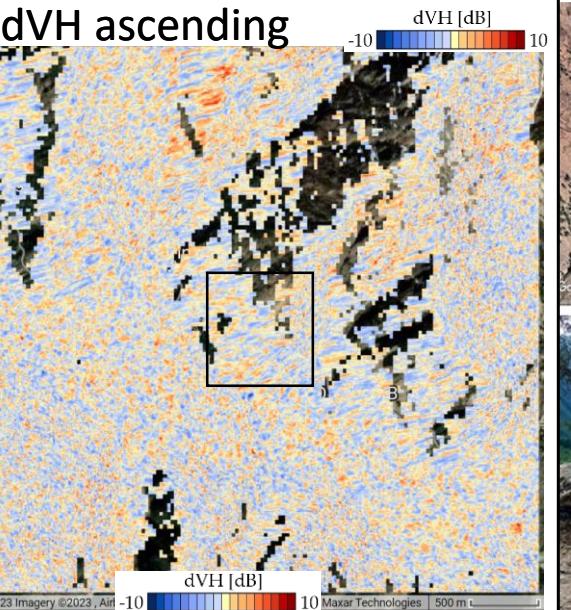
### dVH descending



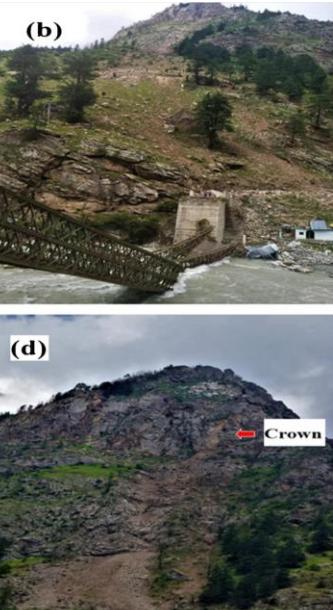
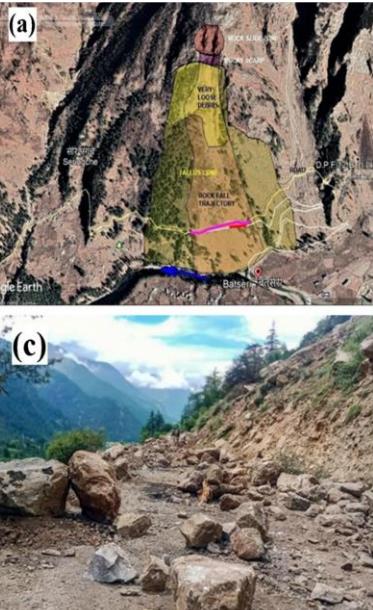
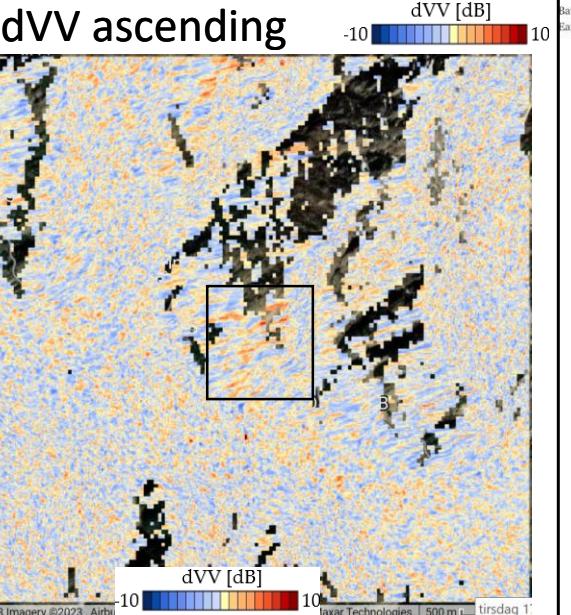
### dVV descending



### dVH ascending

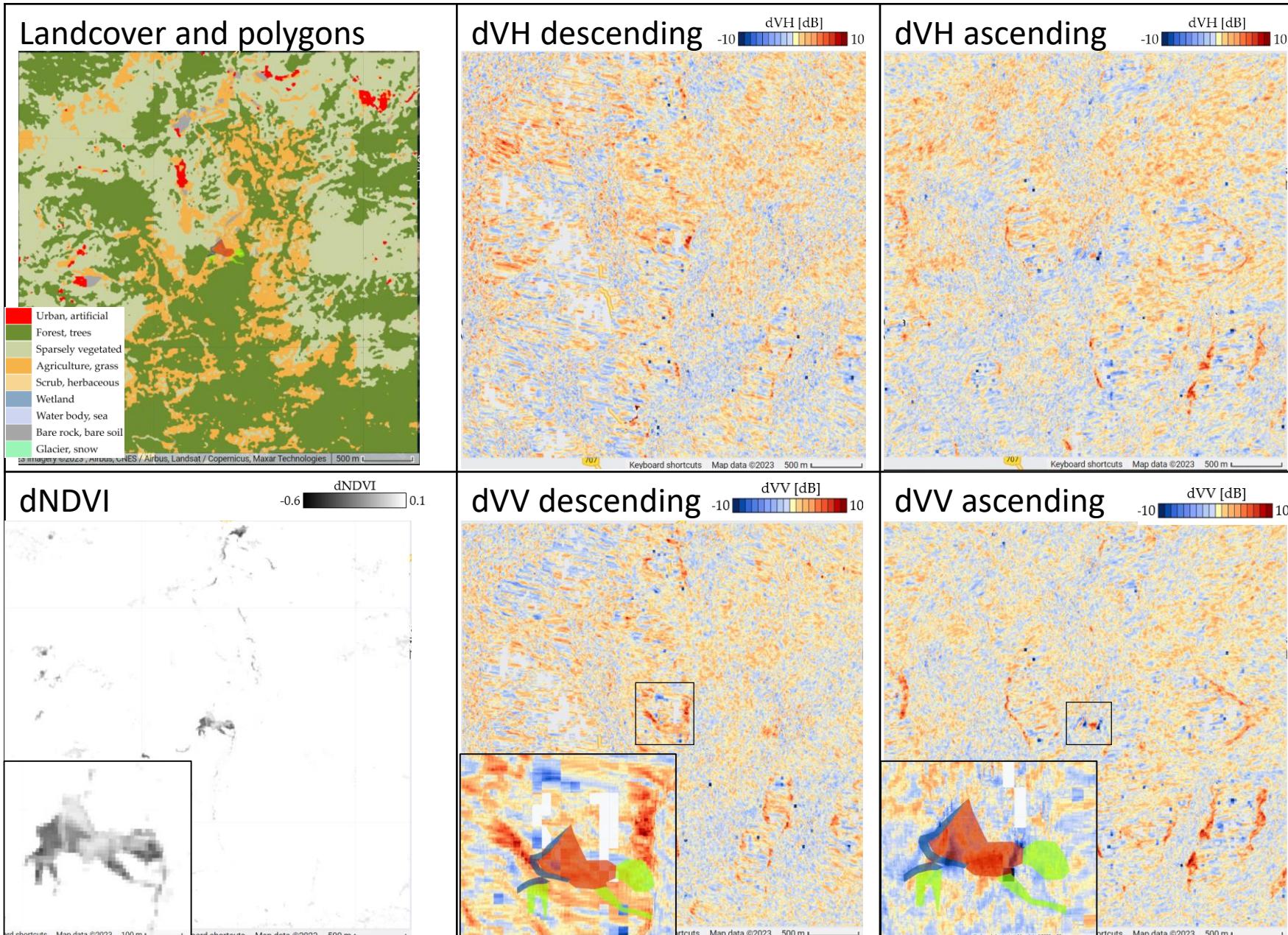


### dVV ascending



Batseri rockfall. a Google Earth image of the area. b Damaged Batseri Bridge. c Rockfall damage to the road. d Rockfall area with the crown. Source: Google Earth and Times of India (TOI) newspaper

<https://link.springer.com/article/10.1007/s10346-021-01802-6/figures/1>



<https://link.springer.com/article/10.1007/s10346-021-01802-6/figures/4>

Kali Dhank landslide

Only USE Ascending  
Descending too much  
distortion

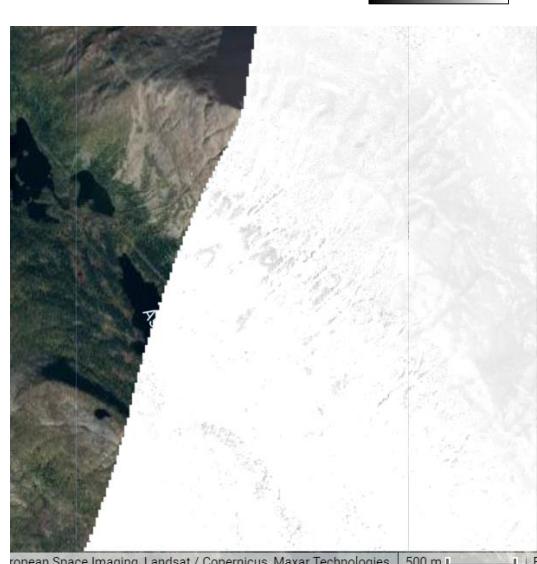
18. Norway

<https://code.earthengine.google.com/6f0cbcfcf3972551ca1b2129768053e>

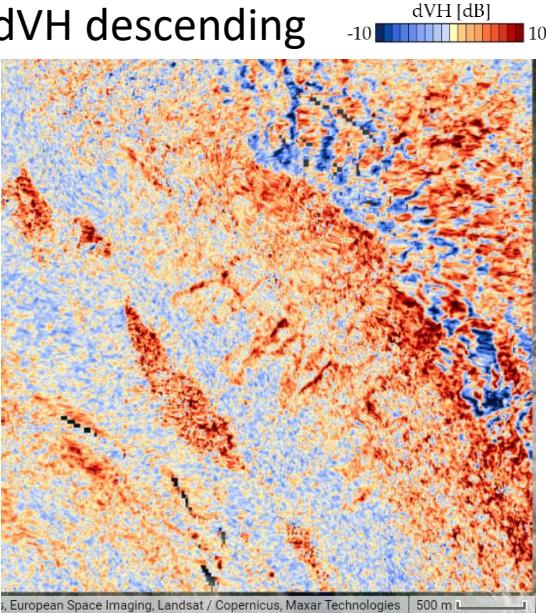
### Landcover and polygons



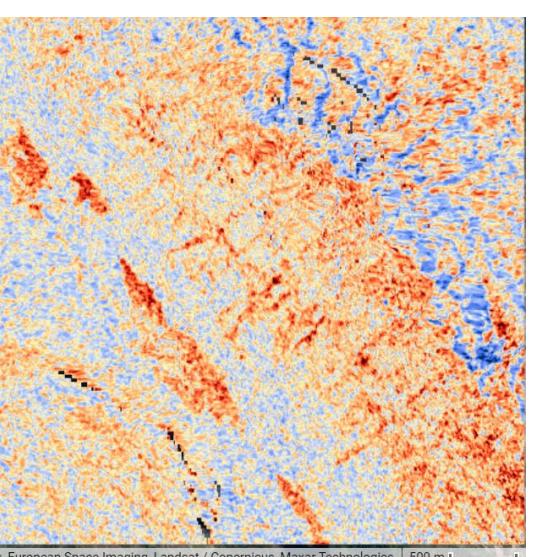
dNDVI



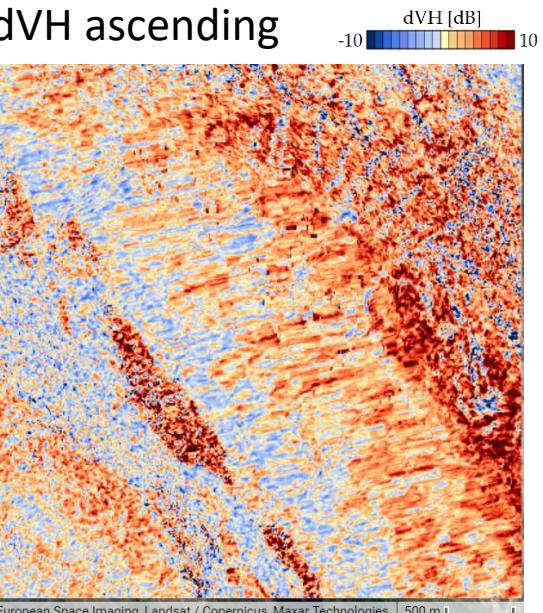
### dVH descending



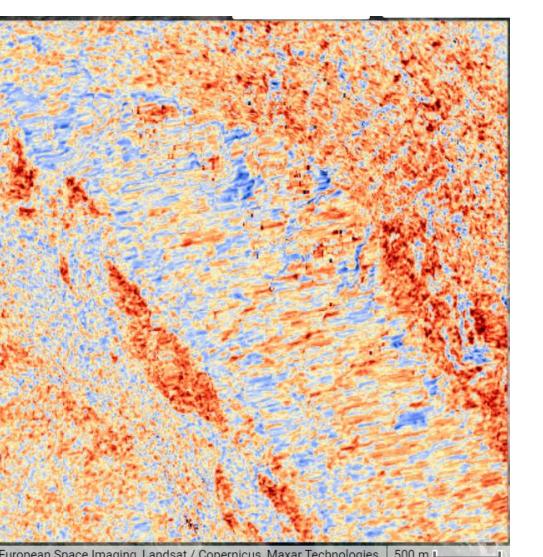
### dVV descending



### dVH ascending

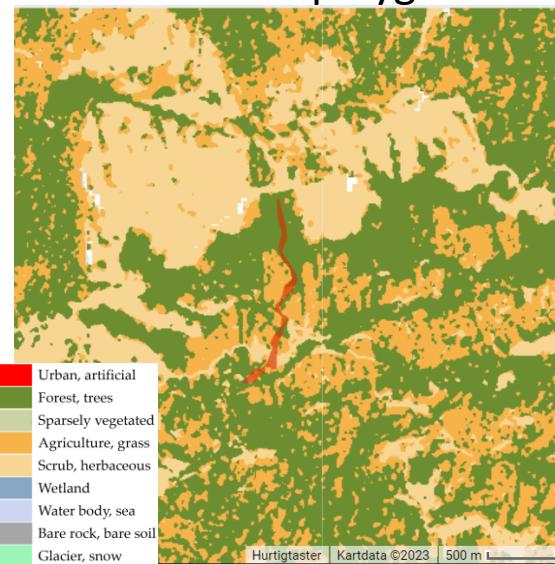


### dVV ascending

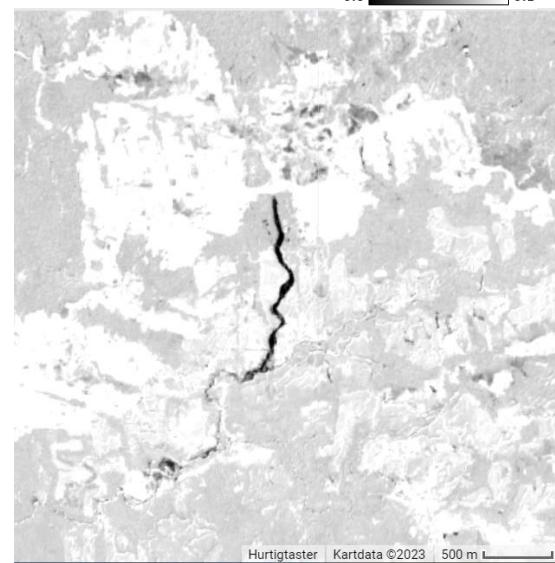


<https://www.regobs.no/Registration/193067>

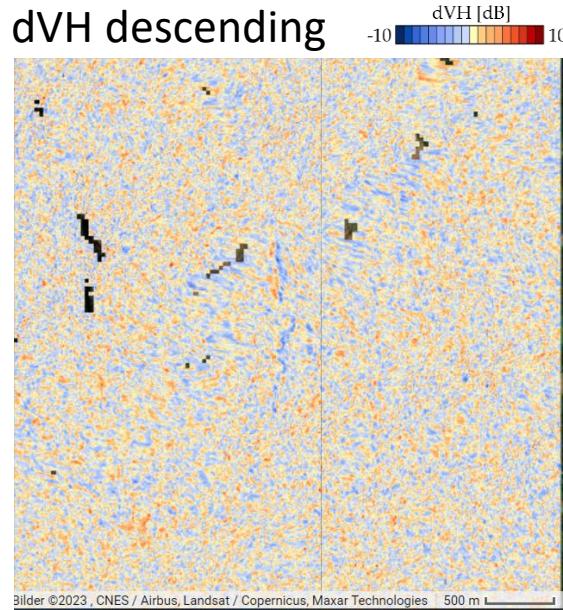
Landcover and polygons



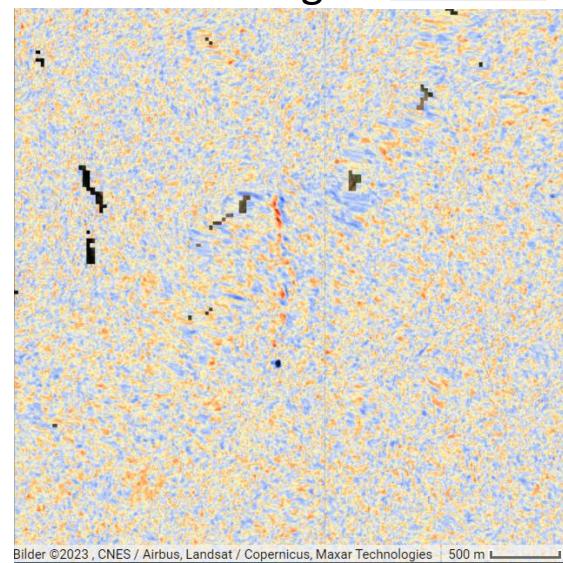
dNDVI



dVH descending

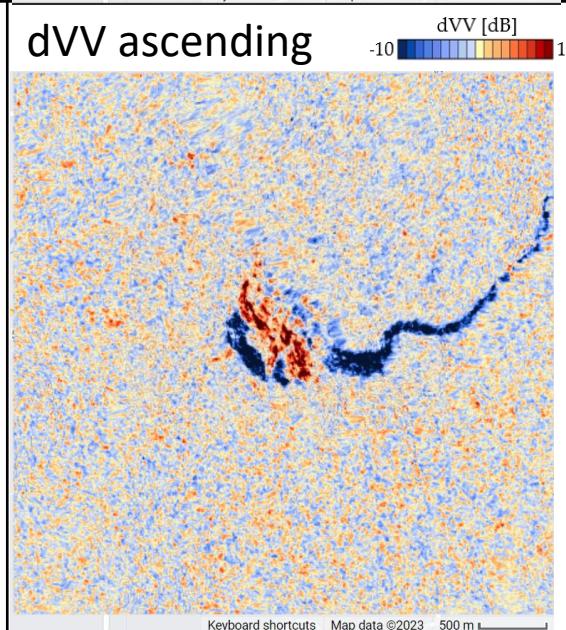
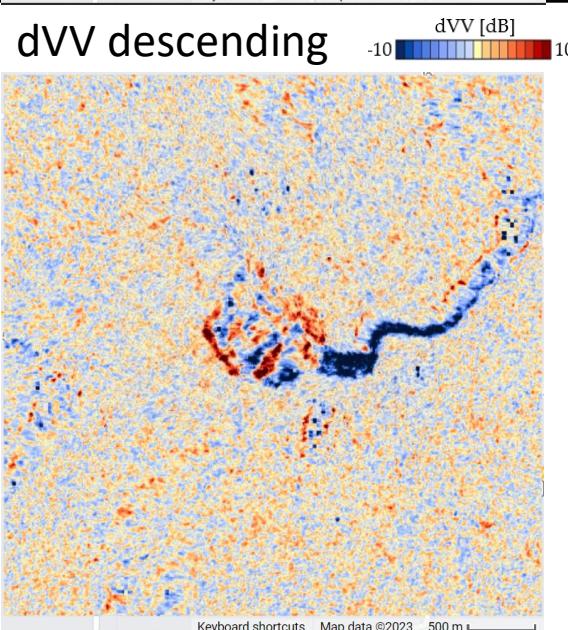
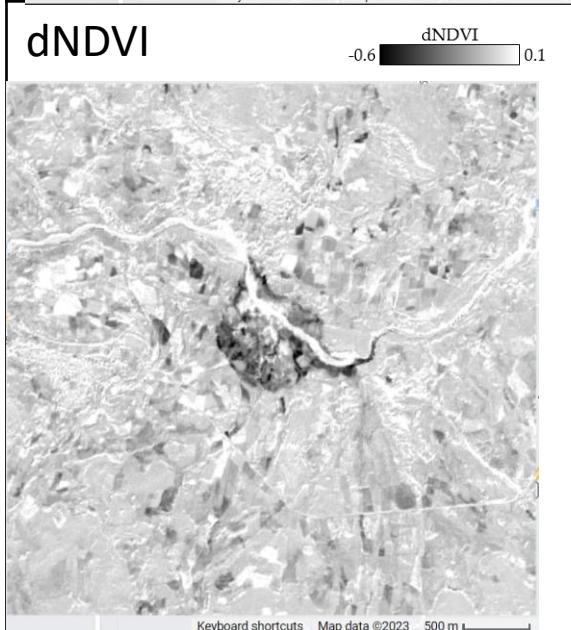
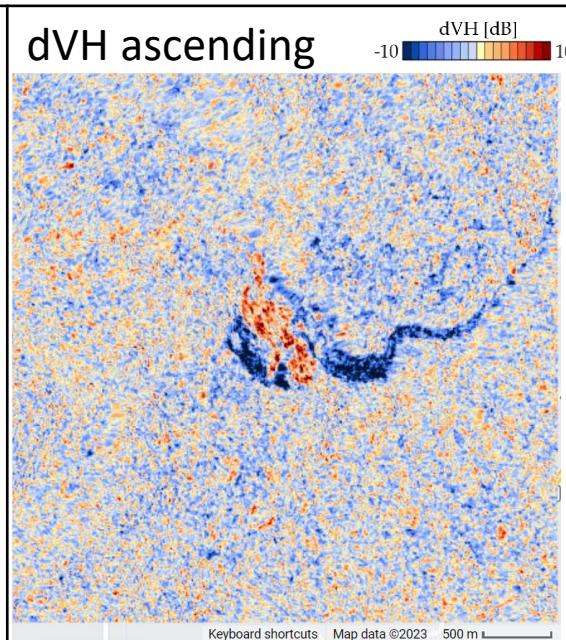
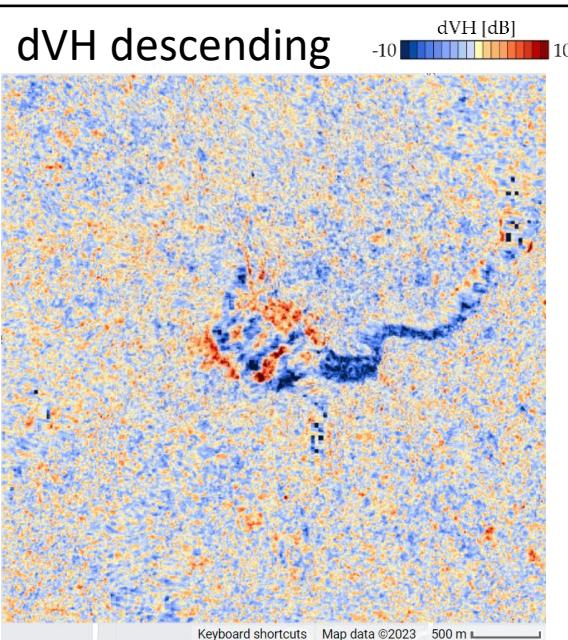
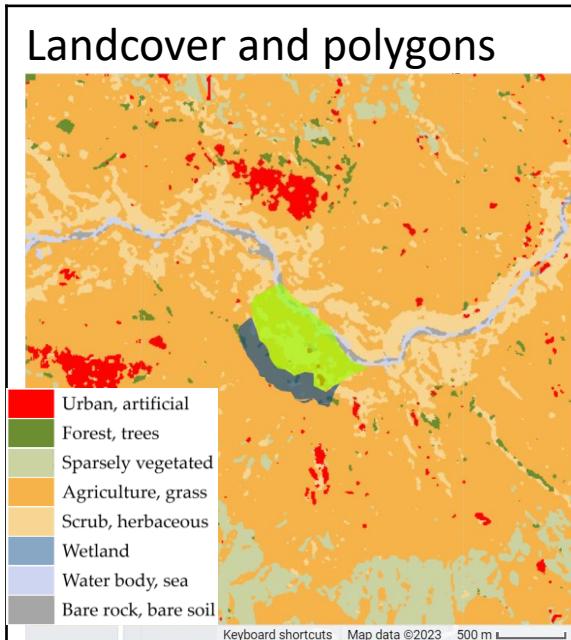


dVV descending



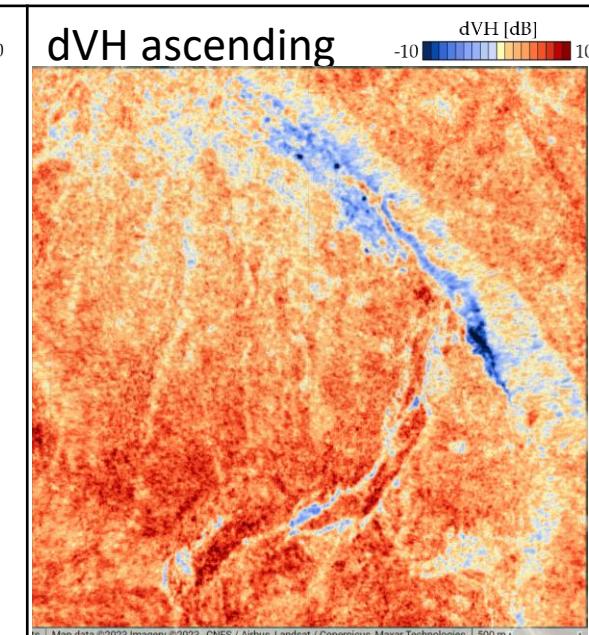
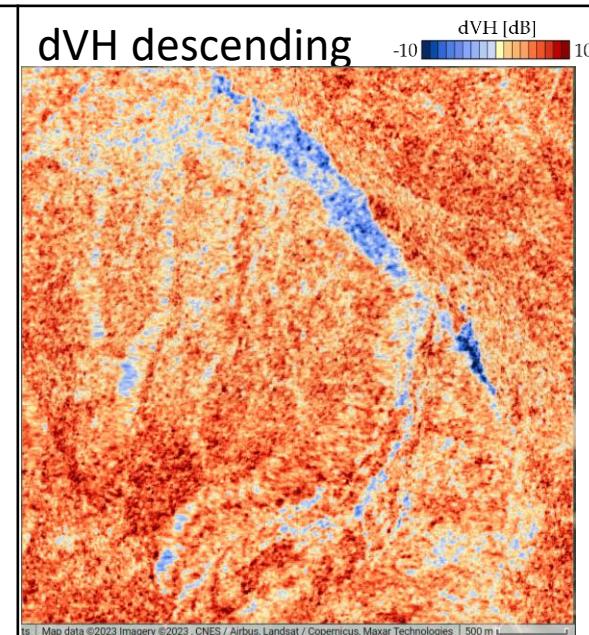
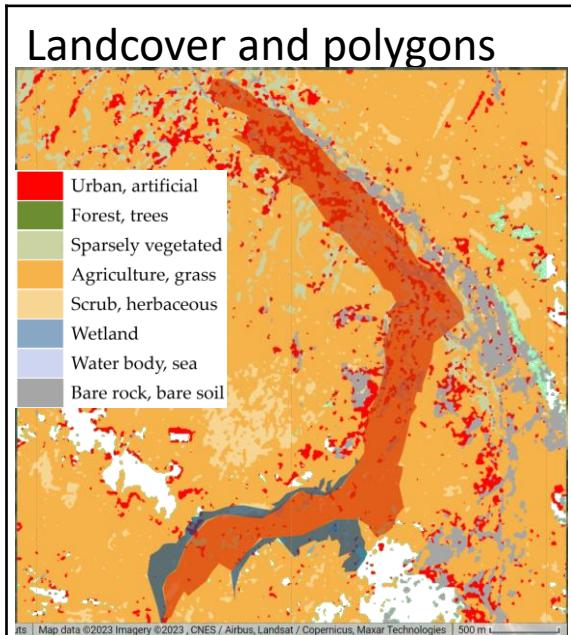
<https://blogs.agu.org/landslideblog/2020/08/14/pettimudi-landslide/>

## 20. Peru <https://code.earthengine.google.com/f5a9793b79b4cf8e604018c3c2c963a6>



## 21. Kyrgyzstan

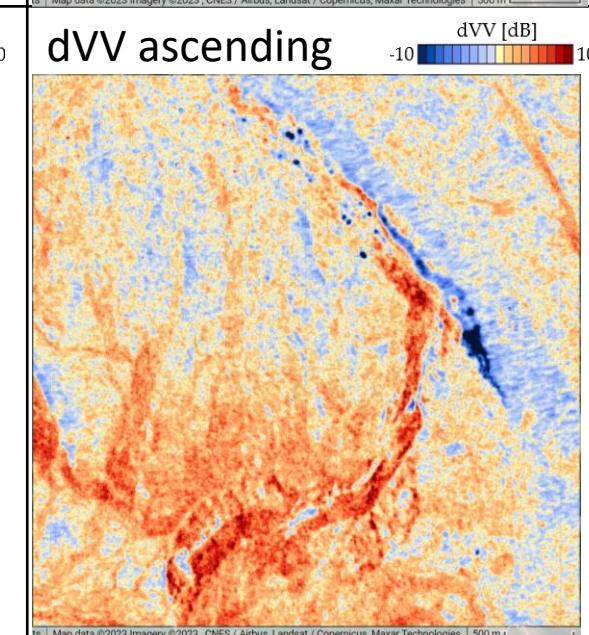
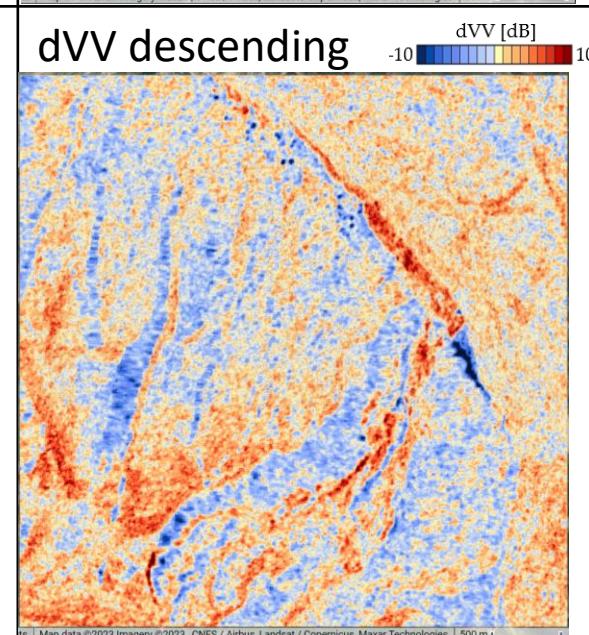
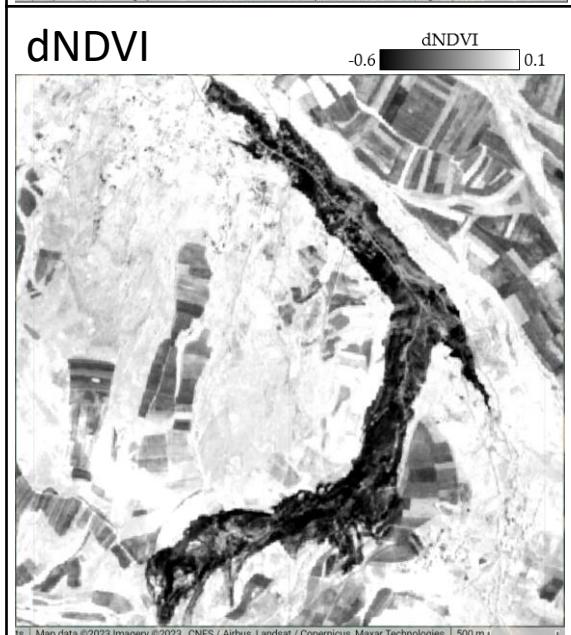
<https://code.earthengine.google.com/0b7c8745f67bbec65fa86a60ae7d055d>



<https://watchers.news/2017/05/17/kurbu-tash-landslide-kyrgyzstan/>

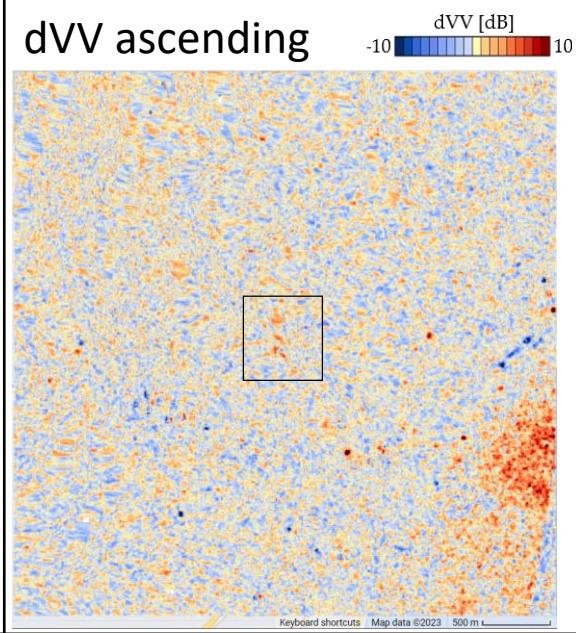
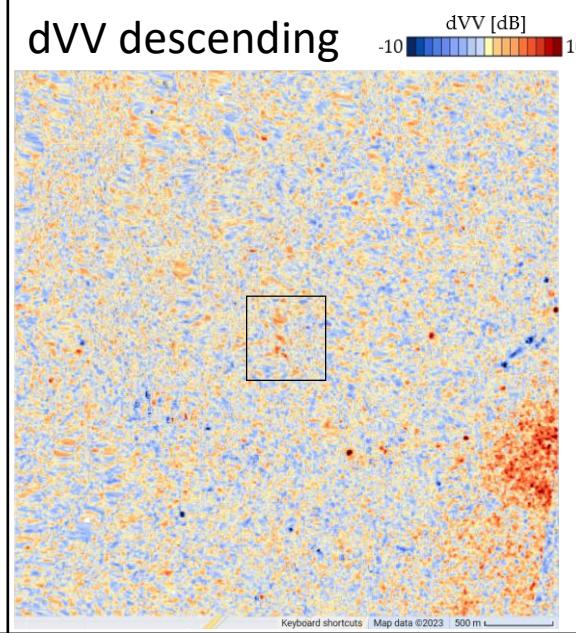
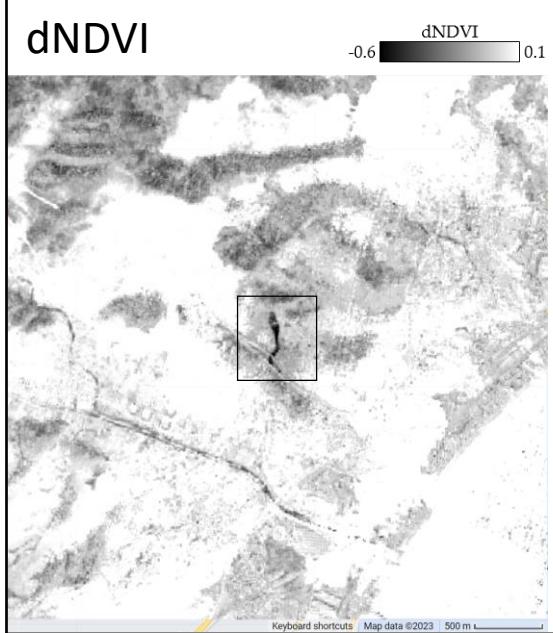
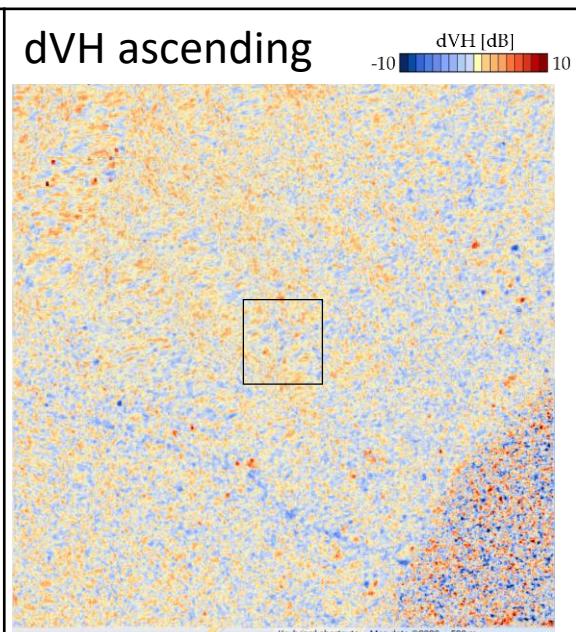
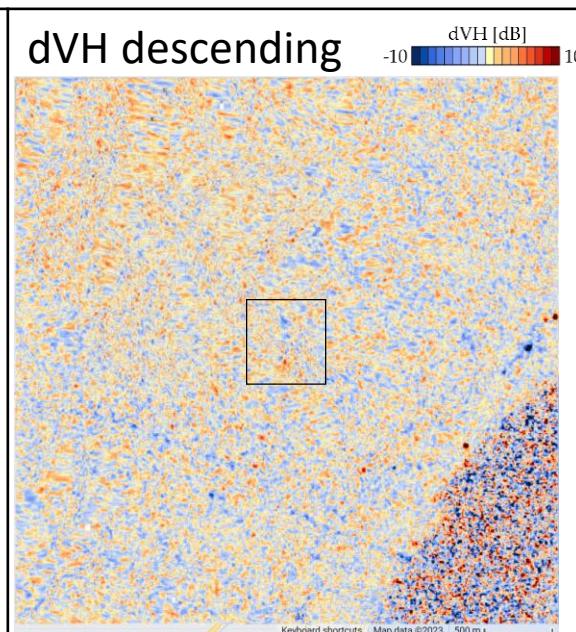
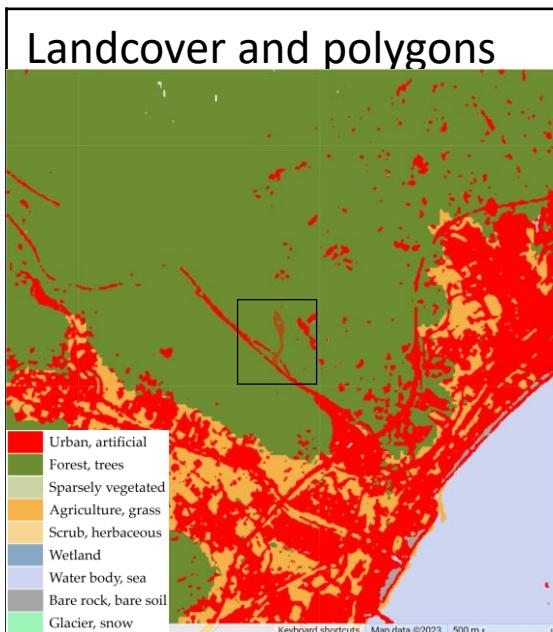


<https://statics.teams.cdn.office.net/evergreen-assets/safelinks/1/atp-safelinks.html>



[https://www.researchgate.net/publication/319858939\\_Evaluation\\_of\\_Remote-Sensing-Based\\_Landslide\\_Inventories\\_for\\_Hazard\\_Assessment\\_in\\_Southern\\_Kyrgyzstan/figures?lo=1](https://www.researchgate.net/publication/319858939_Evaluation_of_Remote-Sensing-Based_Landslide_Inventories_for_Hazard_Assessment_in_Southern_Kyrgyzstan/figures?lo=1)

## 22. Italy

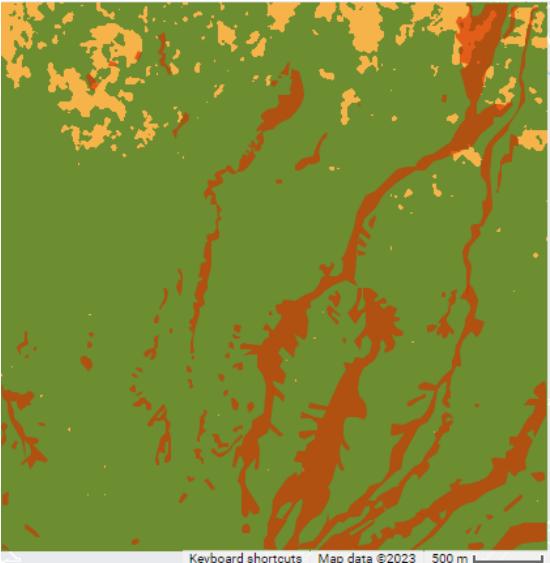


The aftermath of the landslide on the A6 near to Savona in Italy. [Image via Youtube](#).

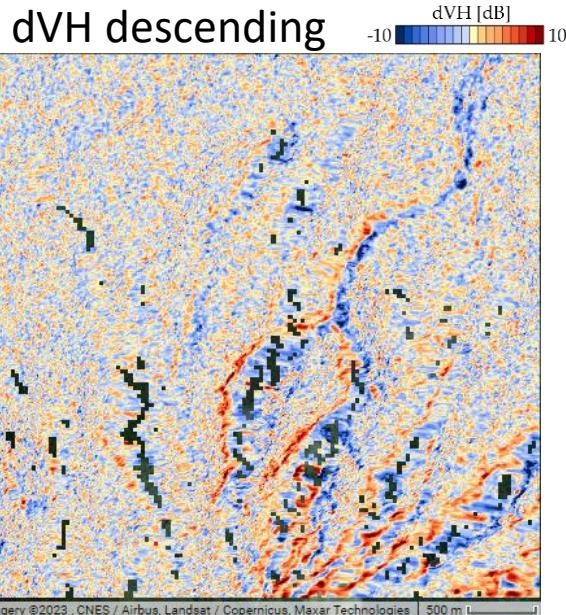
<https://blogs.agu.org/landslideblog/2019/11/25/savona-landslide-1/>

## 23. Indonesia <https://code.earthengine.google.com/36b634abe34522a48beef9ab65af780c>

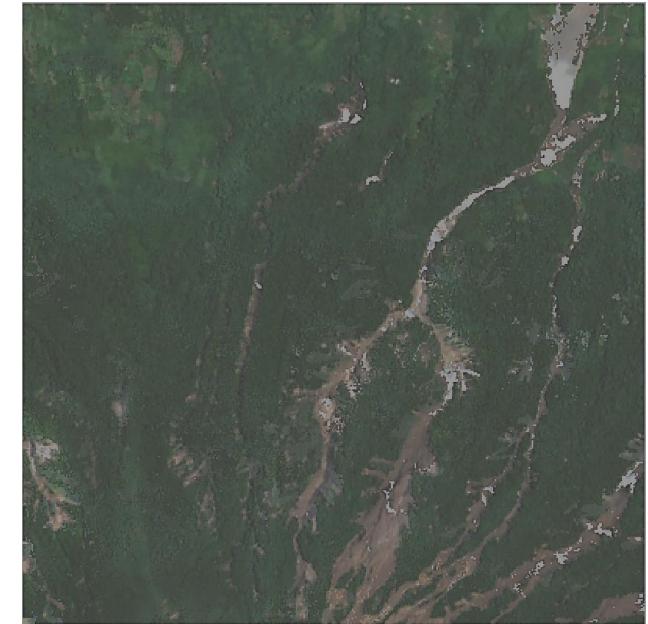
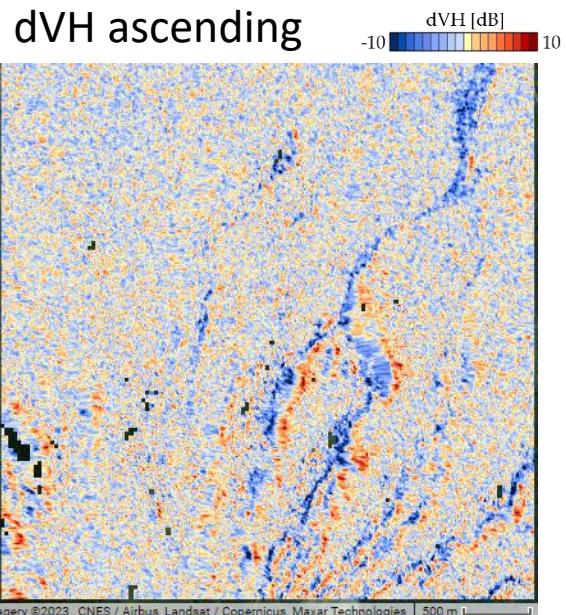
Landcover and polygons



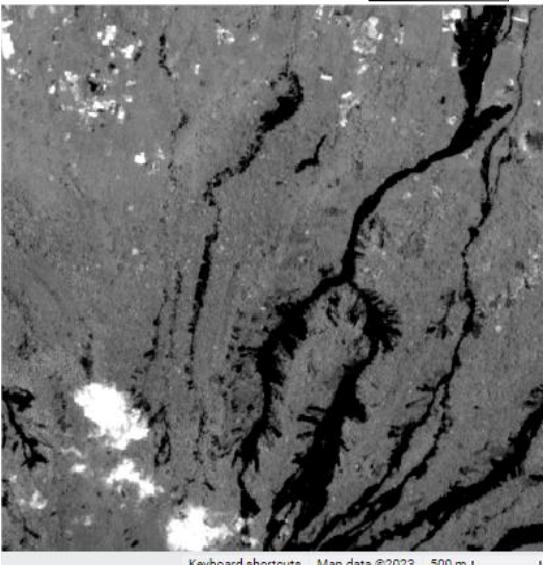
dVH descending



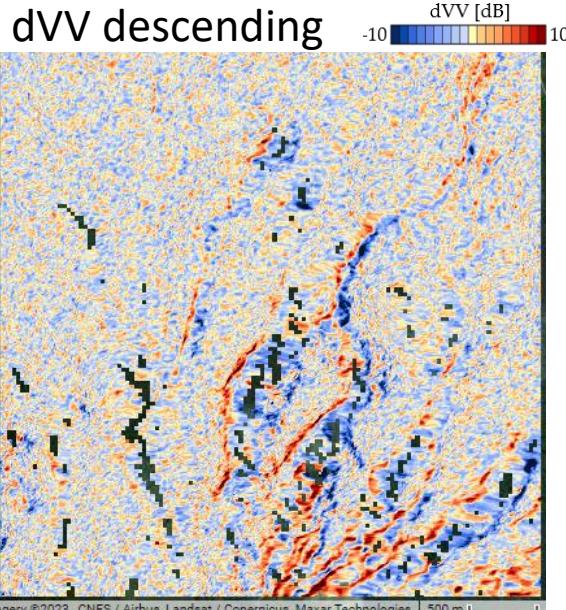
dVH ascending



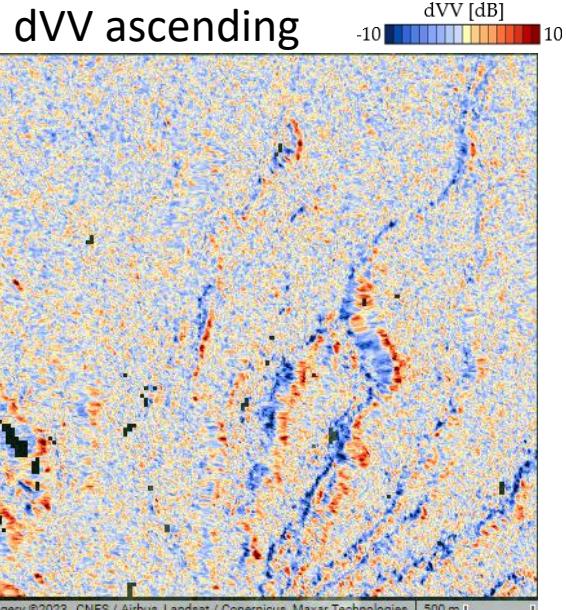
dNDVI



dVV descending



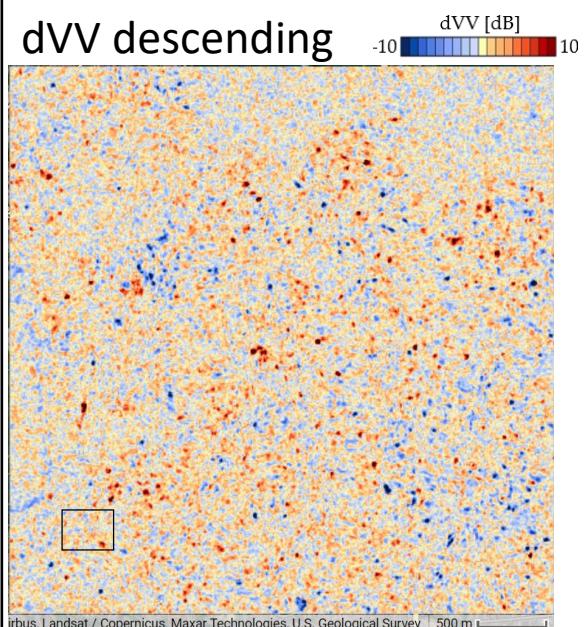
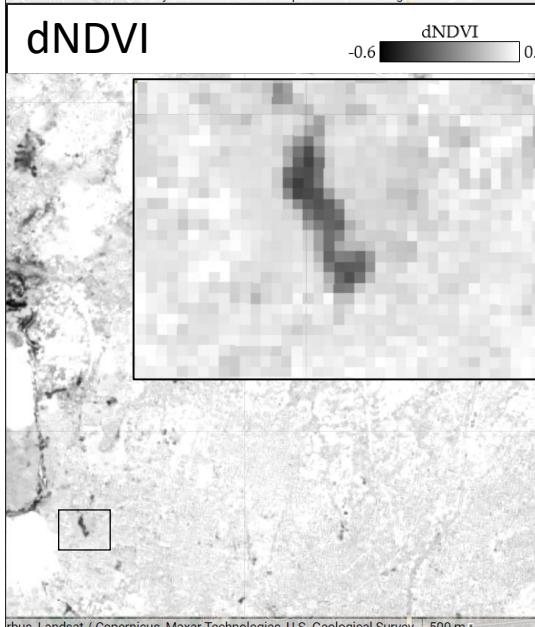
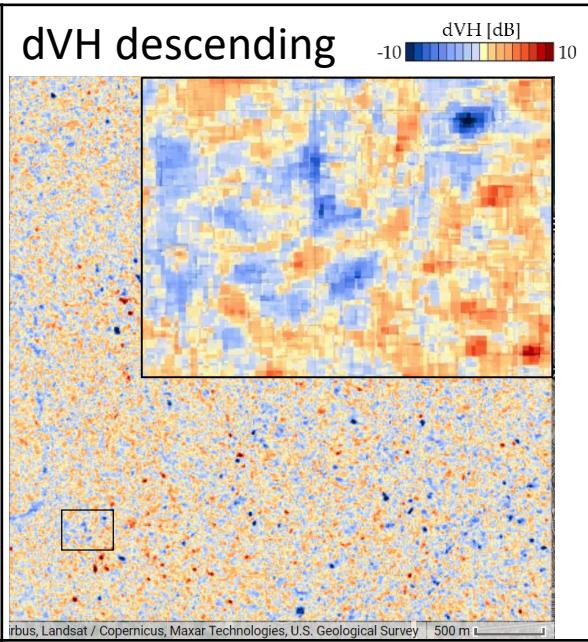
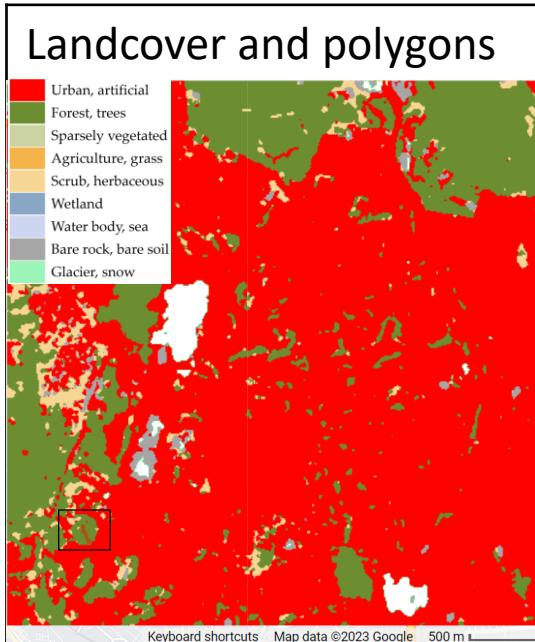
dVV ascending



- Urban, artificial
- Forest, trees
- Sparsely vegetated
- Agriculture, grass
- Scrub, herbaceous
- Wetland
- Water body, sea
- Bare rock, bare soil
- Glacier, snow

24. Brazil

<https://code.earthengine.google.com/acb03ebe8054fa4a418db505cafe1e24>



Before and after images of a landslide in the Cohab neighbourhood of Recife, Brazil. [Image by Globo using Google Street View.](#)

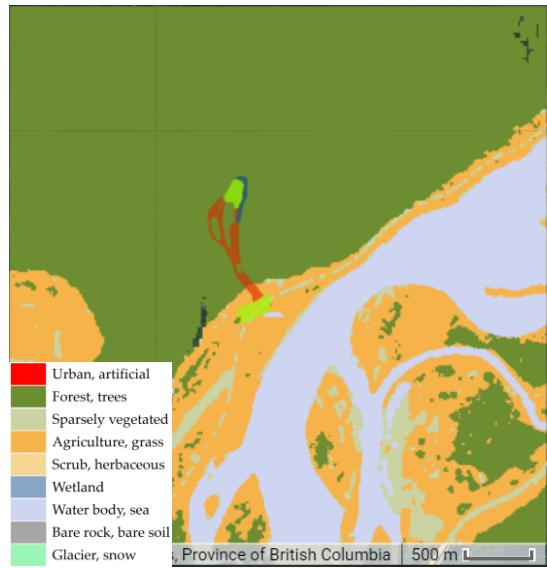
<https://blogs.agu.org/landslideblog/2022/05/31/recife-1/>



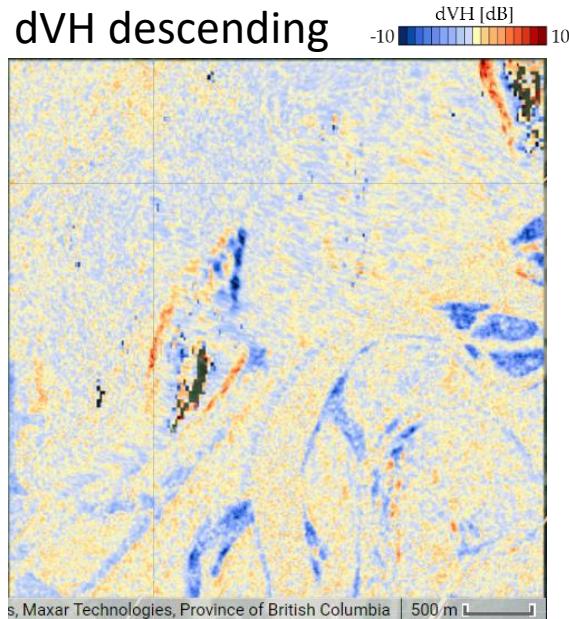
25. Canada

<https://code.earthengine.google.com/152bedea17f40658468fc4f214a6ef06>

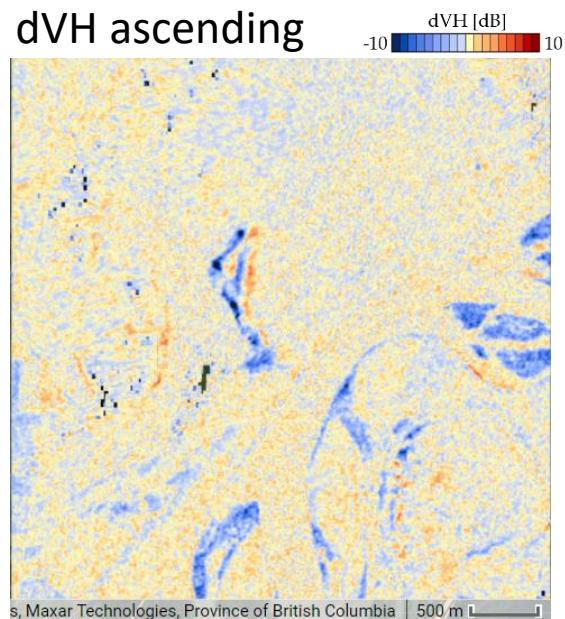
Landcover and polygons



dVH descending



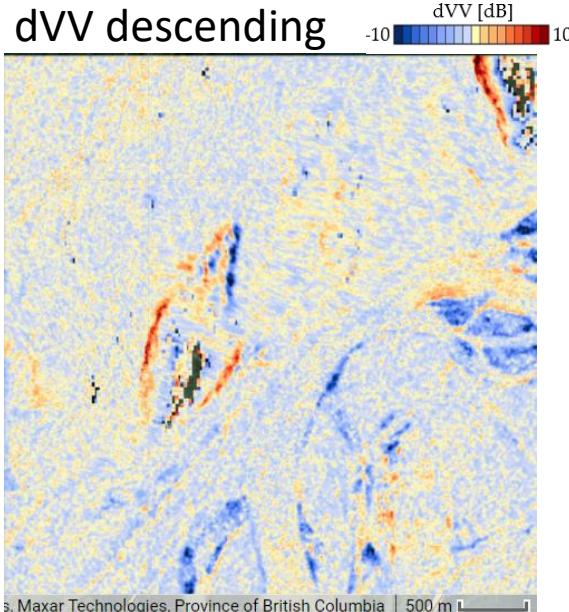
dVH ascending



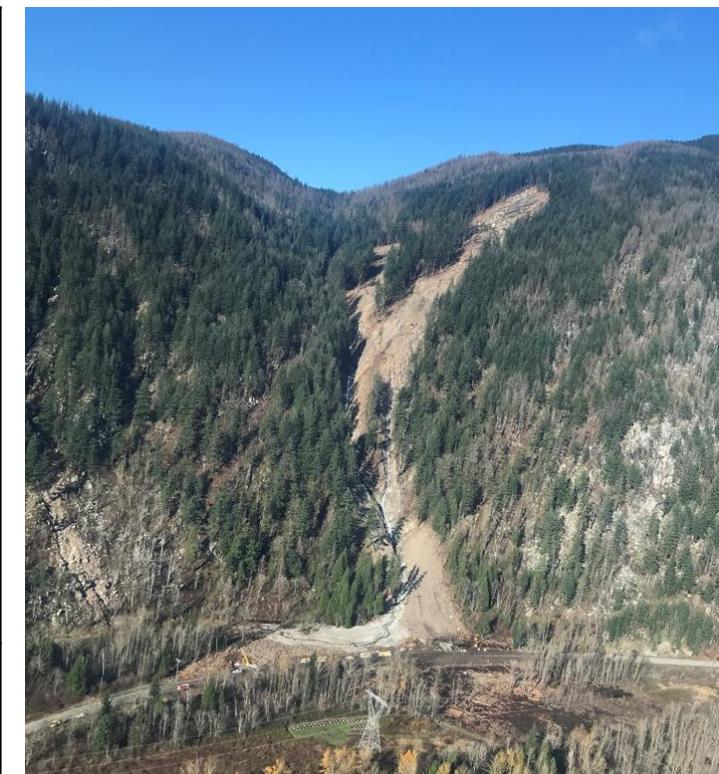
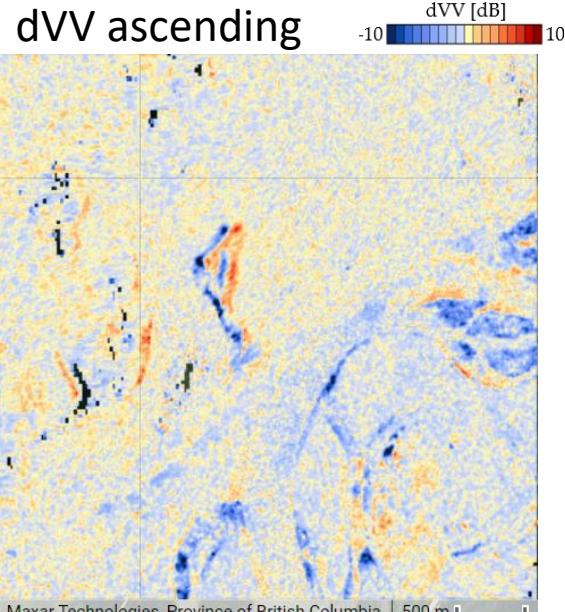
dNDVI



dVV descending



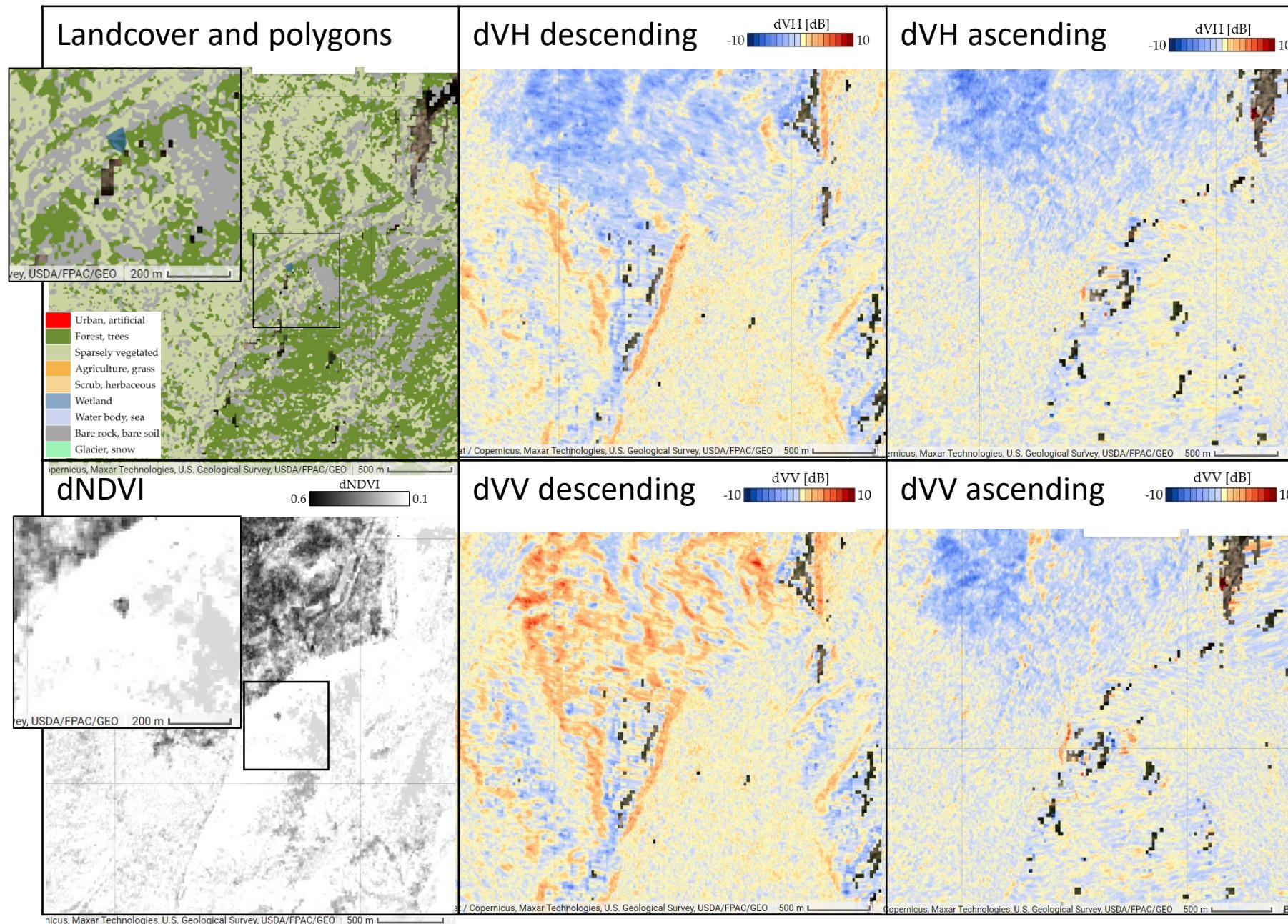
dVV ascending



<https://twitter.com/venditilab/status/1463091049463615490>

26. USA

<https://code.earthengine.google.com/cdd78a4500d976b810c6e206dc16d101>



[https://twitter.com/bclemms/  
status/145233392694982246  
8?lang=en](https://twitter.com/bclemms/status/145233392694982246)



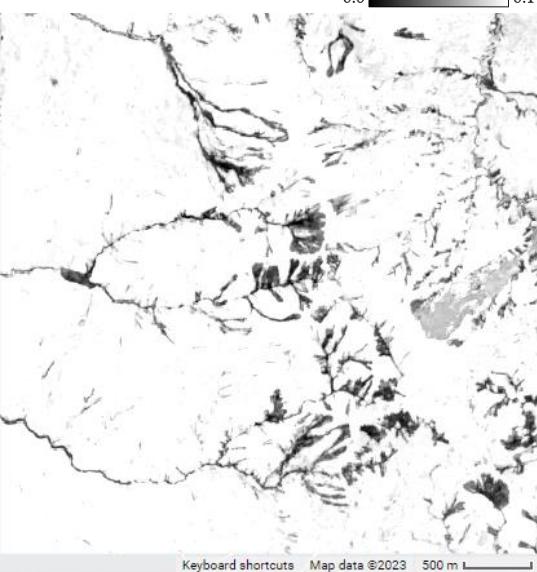
27. Burundi <https://code.earthengine.google.com/33039902e27fb849fee822045338b8fb>

NOT INCLUDED IN  
STATISTICAL ANALYSES

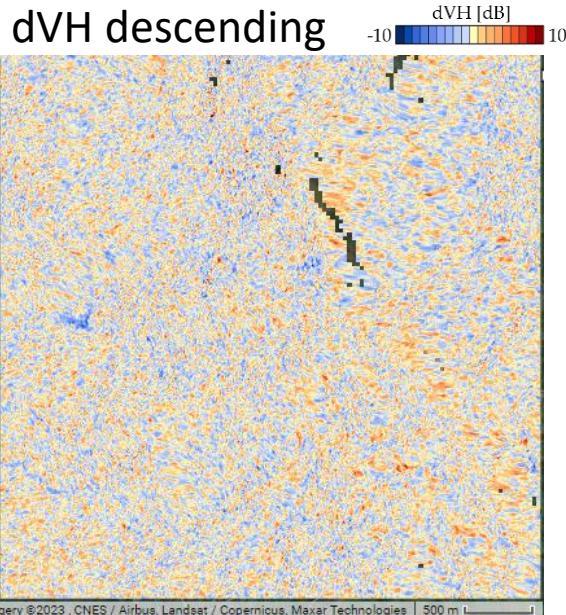
Landcover and polygons



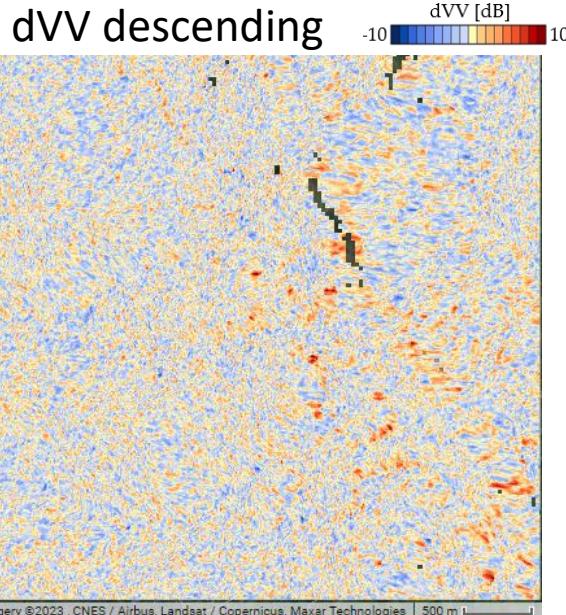
dNDVI



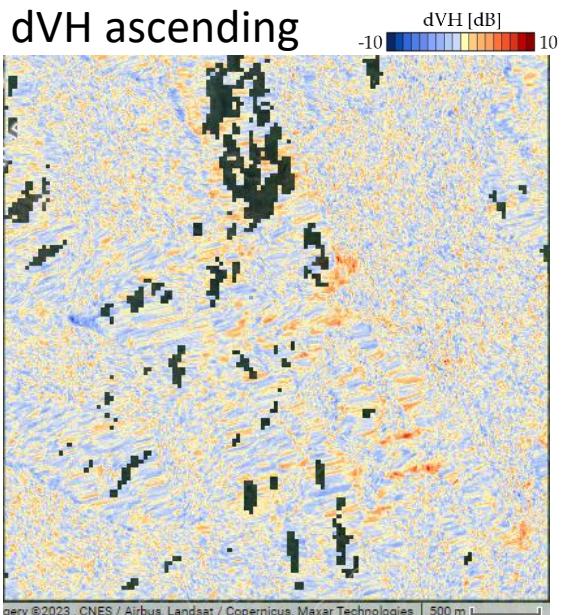
dVH descending



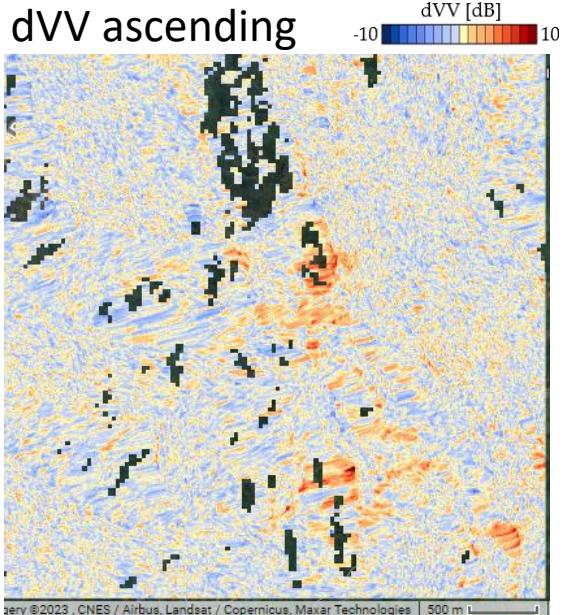
dVV descending



dVH ascending

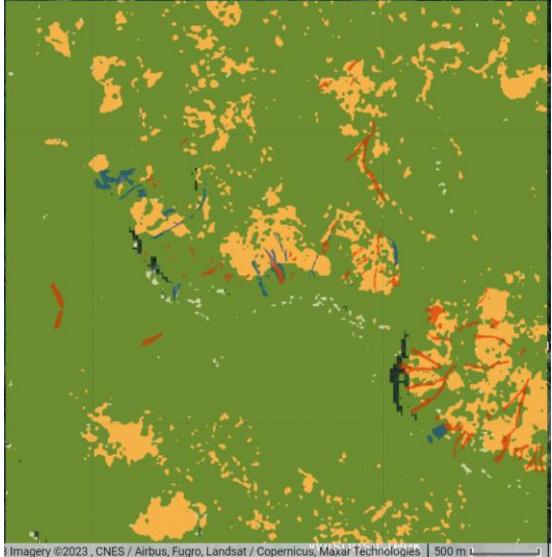


dVV ascending

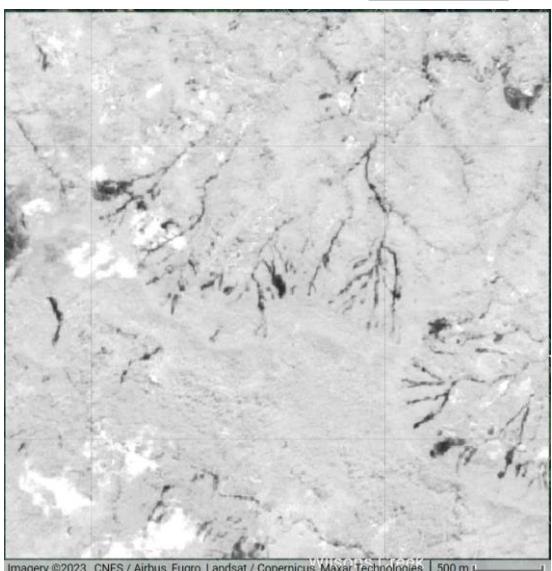


## 28. Australia <https://code.earthengine.google.com/7af9417808c306f8f5fb317d77e3019>

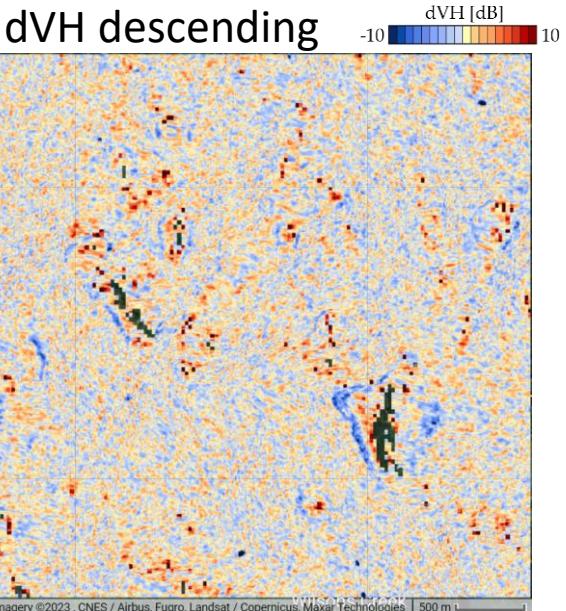
Landcover and polygons



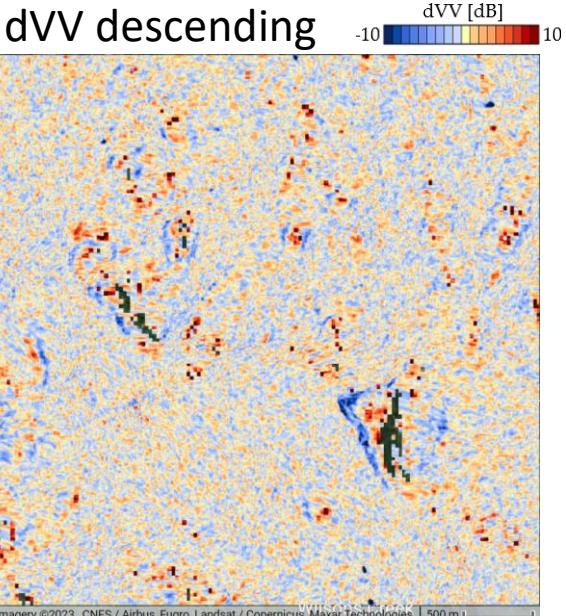
dNDVI



dVH descending

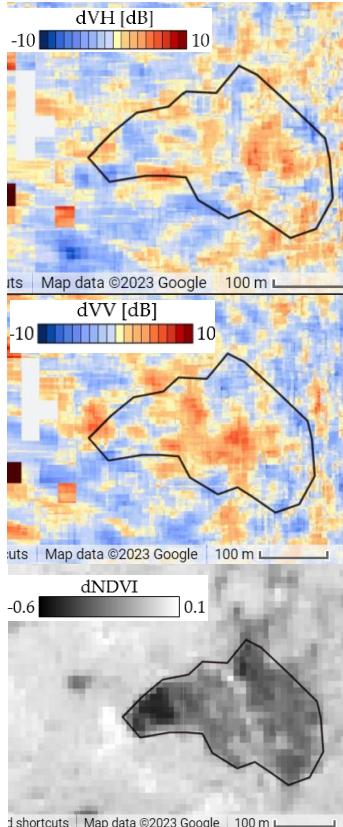


dVV descending



The landslide at main Arm in New South Wales, Australia. Image [tweeted](#) by Liam Mendes (@liammendes).

Upper Wilsons Creek (153.3912, -28.5292)

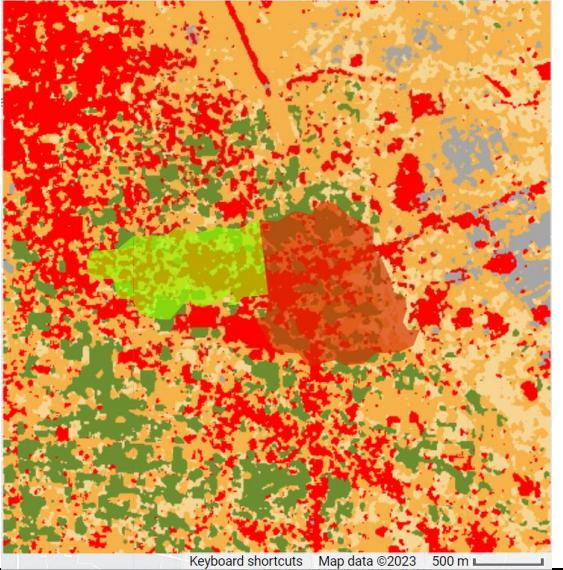


- Urban, artificial
- Forest, trees
- Sparsely vegetated
- Agriculture, grass
- Scrub, herbaceous
- Wetland
- Water body, sea
- Bare rock, bare soil
- Glacier, snow

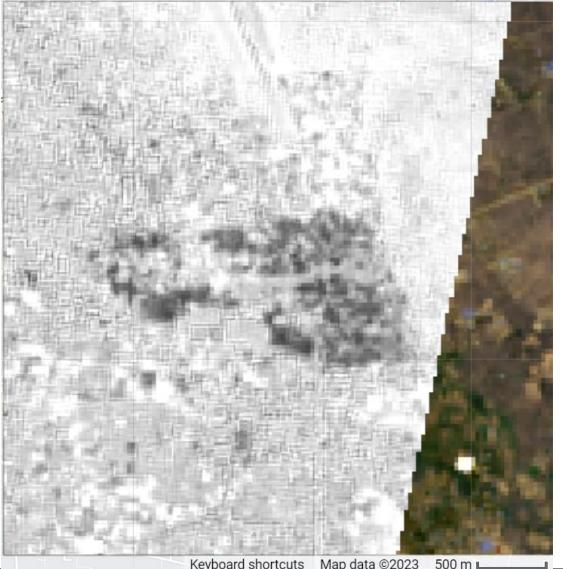
29. Indonesia

<https://code.earthengine.google.com/b25f482b295756d4ef9fc82ad5428298>

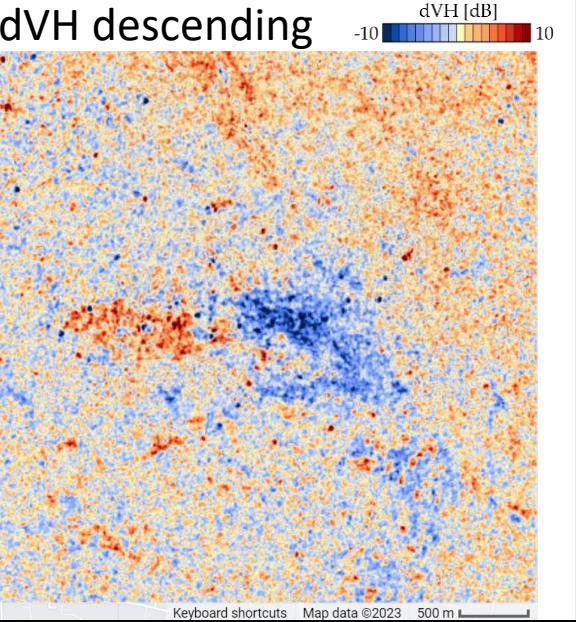
## Landcover and polygons



dNDVI (Landsat 8)



## dVH descending



dVV descending

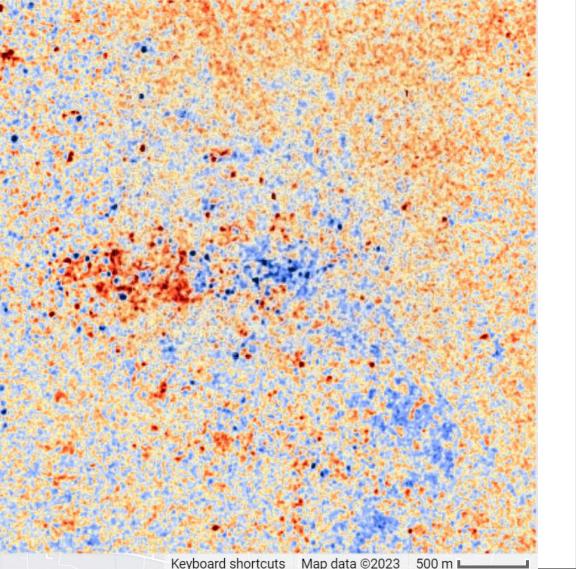
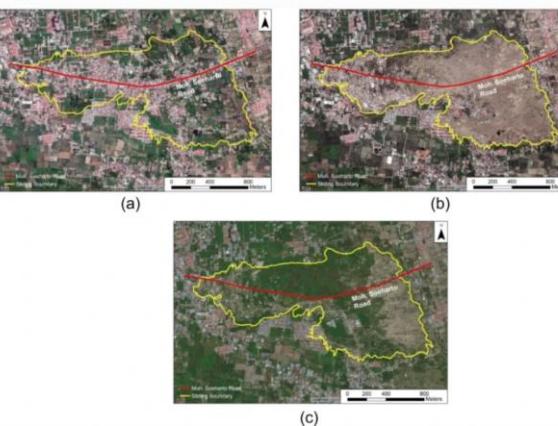


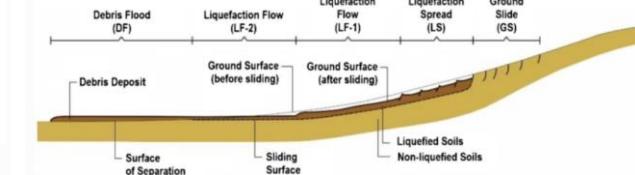
Fig. 6



Site conditions before and after earthquake are documented at three different times taken from Google Earth. **a** Before the slide on 2018.08.17, the site could be seen with dense population. **b** Four days after the slide on 2018.10.02. **c** Recent image on 2019.11.06

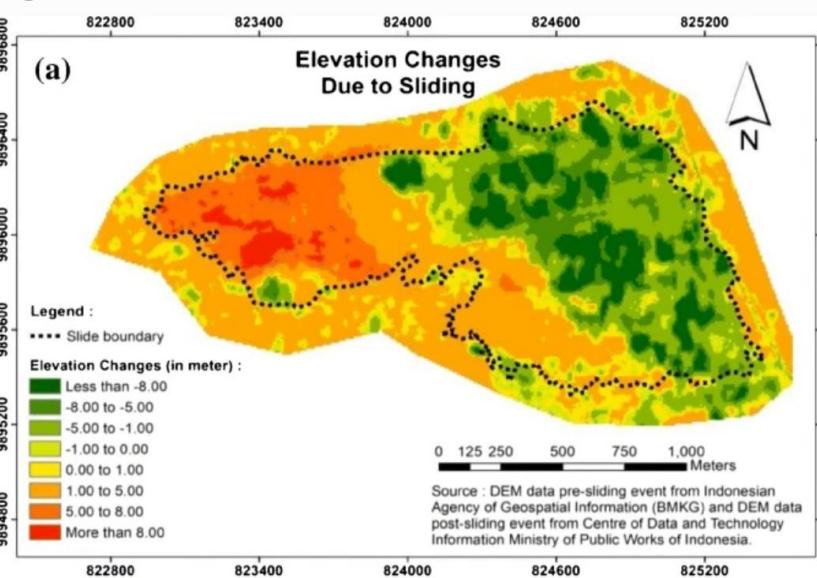
<https://link.springer.com/article/10.1007/s10346-021-01700-x>

Fig. 17



Schematic illustration of types of morphological zonation observed in Petobo sliding area due to 2018 Palu-Donggala earthquake

Fig. 13

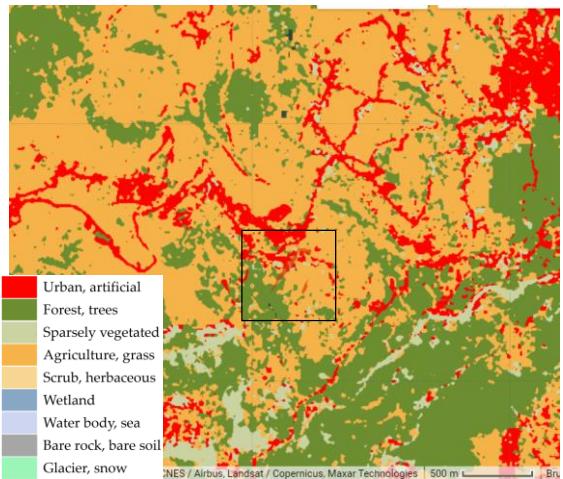


- Urban, artificial
- Forest, trees
- Sparsely vegetated
- Agriculture, grass
- Scrub, herbaceous
- Wetland
- Water body, sea
- Bare rock, bare soil
- Glacier, snow

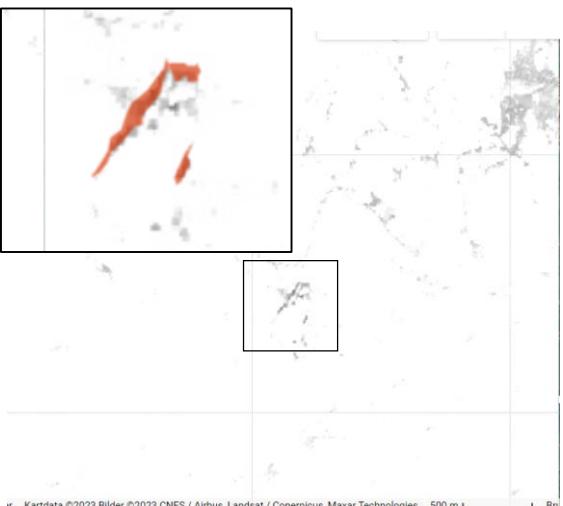
### 30. Turkey

<https://code.earthengine.google.com/08d8a938f5476bf26a8ce95d6404b932>

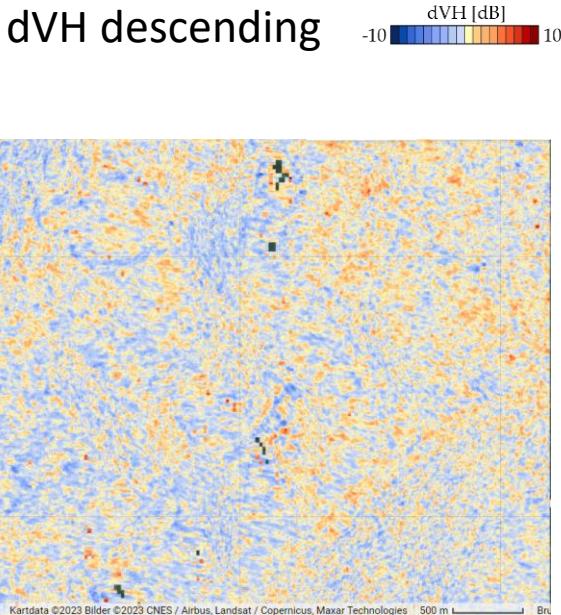
Landcover and polygons



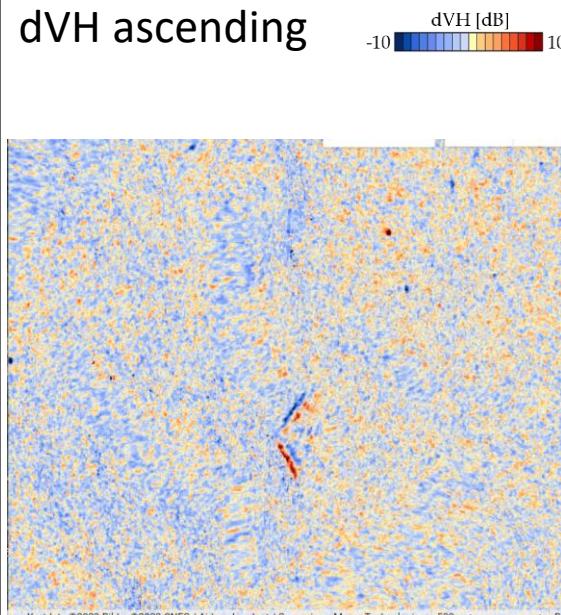
dNDVI



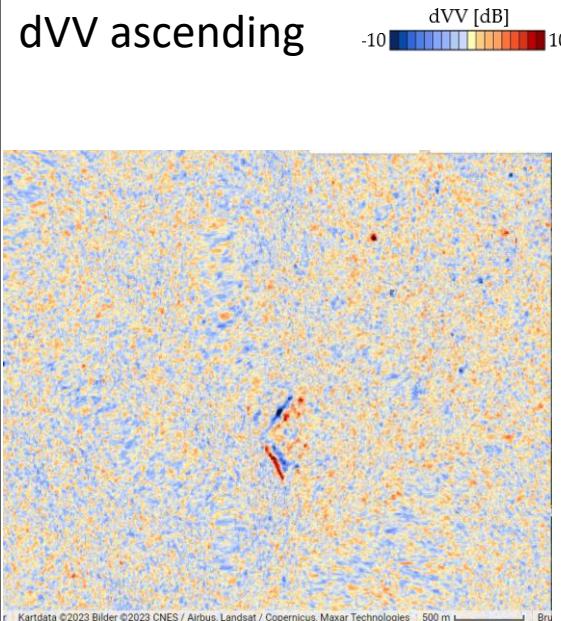
dVH descending



dVH ascending



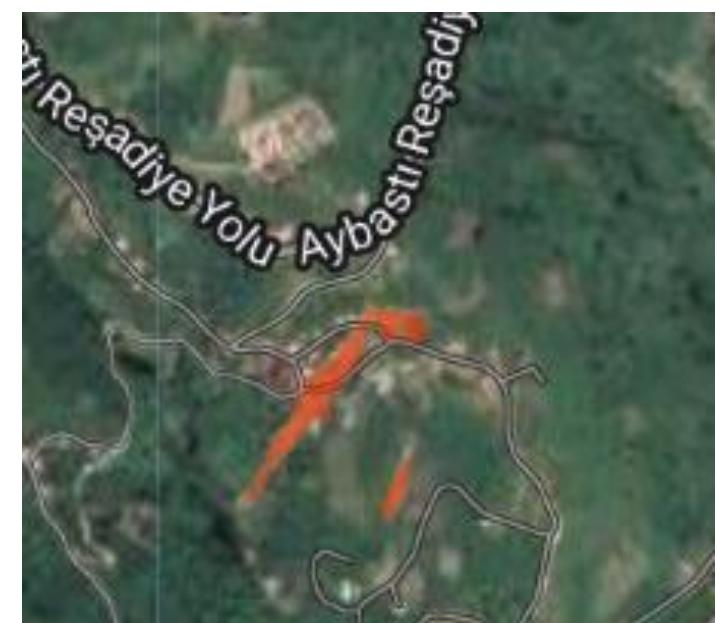
dVV descending



dVV ascending



<https://blogs.agu.org/landslideblog/2019/05/17/ordu-1/>



31. New Zealand <https://code.earthengine.google.com/431a54565d0ffa7cf20819095e7fcfd0>

