Flood depth maps used for training & testing in "*Subgrid informed neural networks for high-resolution flood mapping*" & "*Flood-LDM: Generalizable latent diffusion models for rapid and accurate zero-shot high-resolution flood mapping*" papers [Dataset]

Authors: Herath Mudiyanselage Viraj Vidura Herath, Lucy Marshall, Abhishek Saha, Sanka Rasnayaka, Sachith Seneviratne, and Neo Sun Han

Contact: viraj.herath@sydney.edu.au

1. Abstract

This dataset contains coarse-grid flood maps, fine-grid flood maps, and Digital Elevation Model (DEM) images with a spatial resolution of 512 × 512 pixels, which were used to train and evaluate deep learning models in the studies *"Subgrid informed neural networks for high-resolution flood mapping"* [1] and *"Flood-LDM: Generalizable Latent Diffusion Models for Rapid and Accurate Zero-Shot High-Resolution Flood Mapping"* [2]. Flood simulations for both coarse and fine computational grids were generated using the HEC-RAS hydraulic modelling software developed by the US Army Corps of Engineers [3]. Simulations were conducted for three Australian catchments: Wollombi, Burnett, and Chowilla. DEM datasets for the Wollombi and Burnett catchments were obtained from the ELVIS – Elevation and Depth – Foundation Spatial Data portal [4] while the DEM for the Chowilla floodplain was sourced from the dataset provided by Niels Fraehr [5]. Rainfall and inflow forcing data used to drive the hydrodynamic simulations were obtained from the Bureau of Meteorology Water Data Online portal [6]. The dataset includes paired coarse- and fine-resolution flood depth maps together with corresponding DEM inputs, enabling the development and benchmarking of machine learning models for rapid high-resolution flood mapping. Flood depth values are provided in centimetres (cm), while DEM elevations are given in metres (m). Due to file size limitations, the dataset is distributed in multiple parts. Further methodological details and guidance on dataset usage can be found in the associated publications.

2. Dataset

2.1. File Names

The dataset contains 29 zip files and one REAMME pdf file.

No	File Name	Description	File type
1	REAMME.pdf	File description	PDF
2	Wollombi_trained_coarse_grid_flood_maps.zip	Wollombi catchment coarse grid flood maps training period	ZIP
3	Wollombi_trained_fine_grid_flood_maps.zip	Wollombi catchment fine grid flood maps training period	ZIP
4	Wollombi_test_fine_grid_flood_maps.zip	Wollombi catchment fine grid flood maps test period	ZIP

5	Wollombi_test_coarse_grid_flood_maps.zip	Wollombi catchment coarse grid flood maps test period	ZIP
6	Wollombi_dem_images.zip	Wollombi catchment DEM images	ZIP
7	Burnett_dem_images.zip	Burnett catchment DEM images	ZIP
8	Burnett_test_coarse_flood_maps.zip	Burnett catchment coarse grid flood maps testing period	ZIP
9	Burnett_test_fine_flood_maps.zip	Burnett catchment fine grid flood maps testing period	ZIP
10	Burnett_trained_coarse_flood_maps_part1.zip	Burnett catchment coarse grid flood maps training period (Part 01)	ZIP
11	Burnett_trained_coarse_flood_maps_part2.zip	Burnett catchment coarse grid flood maps training period (Part 02)	ZIP
12	Burnett_trained_fine_flood_maps_part1.zip	Burnett catchment fine grid flood maps training period (Part 01)	ZIP
13	Burnett_trained_fine_flood_maps_part2.zip	Burnett catchment fine grid flood maps training period (Part 02)	ZIP
14	Chowilla_dem_images.zip	Chowilla catchment DEM images	ZIP
15	Chowilla_test_coarse_flood_maps_part1.zip	Chowilla catchment coarse grid flood maps testing period (Part 01)	ZIP
16	Chowilla_test_coarse_flood_maps_part2.zip	Chowilla catchment coarse grid flood maps testing period (Part 02)	ZIP
17	Chowilla_test_fine_flood_maps_part1.zip	Chowilla catchment fine grid flood maps testing period (Part 01)	ZIP
18	Chowilla_test_fine_flood_maps_part2.zip	Chowilla catchment fine grid flood maps testing period (Part 02)	ZIP
19	Chowilla_trained_coarse_flood_maps_part1.zip	Chowilla catchment coarse grid flood maps training period (Part 01)	ZIP
20	Chowilla_trained_coarse_flood_maps_part2.zip	Chowilla catchment coarse grid flood maps training period (Part 02)	ZIP
21	Chowilla_trained_coarse_flood_maps_part3.zip	Chowilla catchment coarse grid flood maps training period (Part 03)	ZIP
22	Chowilla_trained_coarse_flood_maps_part4.zip	Chowilla catchment coarse grid flood maps training period (Part 04)	ZIP
23	Chowilla_trained_coarse_flood_maps_part5.zip	Chowilla catchment coarse grid flood maps training period (Part 05)	ZIP
24	Chowilla_trained_coarse_flood_maps_part6.zip	Chowilla catchment coarse grid flood maps training period (Part 06)	ZIP
25	Chowilla_trained_fine_flood_maps_part1.zip	Chowilla catchment fine grid flood maps training period (Part 01)	ZIP
26	Chowilla_trained_fine_flood_maps_part2.zip	Chowilla catchment fine grid flood maps training period (Part 02)	ZIP
27	Chowilla_trained_fine_flood_maps_part3.zip	Chowilla catchment fine grid flood maps training period (Part 03)	ZIP
28	Chowilla_trained_fine_flood_maps_part4.zip	Chowilla catchment fine grid flood maps training period (Part 04)	ZIP
29	Chowilla_trained_fine_flood_maps_part5.zip	Chowilla catchment fine grid flood maps training period (Part 05)	ZIP
30	Chowilla_trained_fine_flood_maps_part6.zip	Chowilla catchment fine grid flood maps training period (Part 06)	ZIP

2.2. Folder Structure

Each ZIP archive contains a collection of GeoTIFF files representing either flood depth maps or DEM images, all with a spatial resolution of 512 × 512 pixels. In total, the dataset is organised into 29 ZIP files, of which 5 correspond to the Wollombi catchment, 7 to the Burnett catchment, and the remaining 17 to the Chowilla catchment.

2.3. Units

Flood depth values in both coarse and fine grids are provided in centimetres (cm), while DEM elevations are given in metres (m).

2.4. Software

Flood simulations for both coarse and fine computational grids were generated using the HEC-RAS hydraulic modelling software developed by the US Army Corps of Engineers [3].

2.5. Resources

DEM datasets for the Wollombi and Burnett catchments were obtained from the ELVIS – Elevation and Depth – Foundation Spatial Data portal [4] while the DEM for the Chowilla floodplain was sourced from the dataset provided by Niels Fraehr [5]. Rainfall and inflow forcing data used to drive the hydrodynamic simulations were obtained from the Bureau of Meteorology Water Data Online portal [6].

References

[1] Herath Mudiyanselage Viraj Vidura Herath, Lucy Marshall, Abhishek Saha, Sanka Rasnayaka, Sachith Seneviratne, Subgrid informed neural networks for high-resolution flood mapping, Journal of Hydrology, Volume 660, Part A, 2025, 133329, ISSN 0022-1694, https://doi.org/10.1016/j.jhydrol.2025.133329.

[2] Sun Han Neo, Sachith Seneviratne, Herath Mudiyanselage Viraj Vidura Herath, Abhishek Saha, Sanka Rasnayaka, Lucy Amanda Marshall; Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2026, pp. 8063-8072.

[3] US Army Corps of Engineers, 2024. *HEC-RAS: River Analysis System* (Version 6.5). Available at: https://www.hec.usace.army.mil/software/hec-ras/ (accessed 4 September 2024).

[4] Geoscience Australia, 2021. *ELVIS – Elevation and Depth – Foundation Spatial Data*. Commonwealth of Australia. Available at: https://elevation.fsdf.org.au/ (accessed 4 September 2024).

[5] Niels Fraehr, 2023. Data from HEC-RAS models for training and validation in "Development of a fast and accurate hybrid model for floodplain inundation simulations" (Version 2) [Dataset]. The University of Melbourne. https://doi.org/10.26188/21235782.

[6] Bureau of Meteorology, 2024. *Water Data Online*. Available at: http://www.bom.gov.au/waterdata/ (accessed 4 September 2024).