

The Information of Jilai Station

In 2009, the extremely heavy rain of typhoon Morakot caused Jilai Village debris flow, which has many of buildings, downstream roads and bridges were destroyed. In order to pre-warn the occurrence of debris flow, Soil and Water Conservation Bureau completed the construction of the Jilai station in Jilai Village, Shanlin District, Kaohsiung City in 2010 (The potential debris flow torrent number, Kaohsiung City DF072).

The information of station			Last updated : 2023/06/30
District	Jilai Village, Shanlin District, Kaohsiung City	Debris Number	Kaohsiung City DF072
Drainage	Gaoping river	River	Qishan river (Nanzixian river)
Rainfall threshold value for debris flow warning	450 mm	Disaster	Stream debris flow
River length	4.07 km	Catchment area	4723 hectares
Geology	Cenozoic Tertiary Sedimentary Rock	Slope	30~50°
Hazards	Silting and burying, bumping	Priority processing level	High
Facility	sand-blocking dam	Coordinate (TWD97)	X coordinate : 207449 Y coordinate : 2547710
Elevation	400 m		
Protected object	Residential	Public building	Transportation facilities
	1~4	None	Provincial Highway 20 · Huoshan bridge
Historical disaster	Typhoon Morakot in August 2009.		
Monitoring results	1. In 2010, typhoon Fanapi caused Jilai debris flow. (1) Accumulated precipitation risen to the warning (9/19 18:51). (2) Steel wire (down) was fractured at upstream. (9/19 10:48) (3) Steel wire (up) was fractured at upstream. (9/19 11:21) (4) Steel wire (down) was fractured at downstream. (9/19 19:04)		

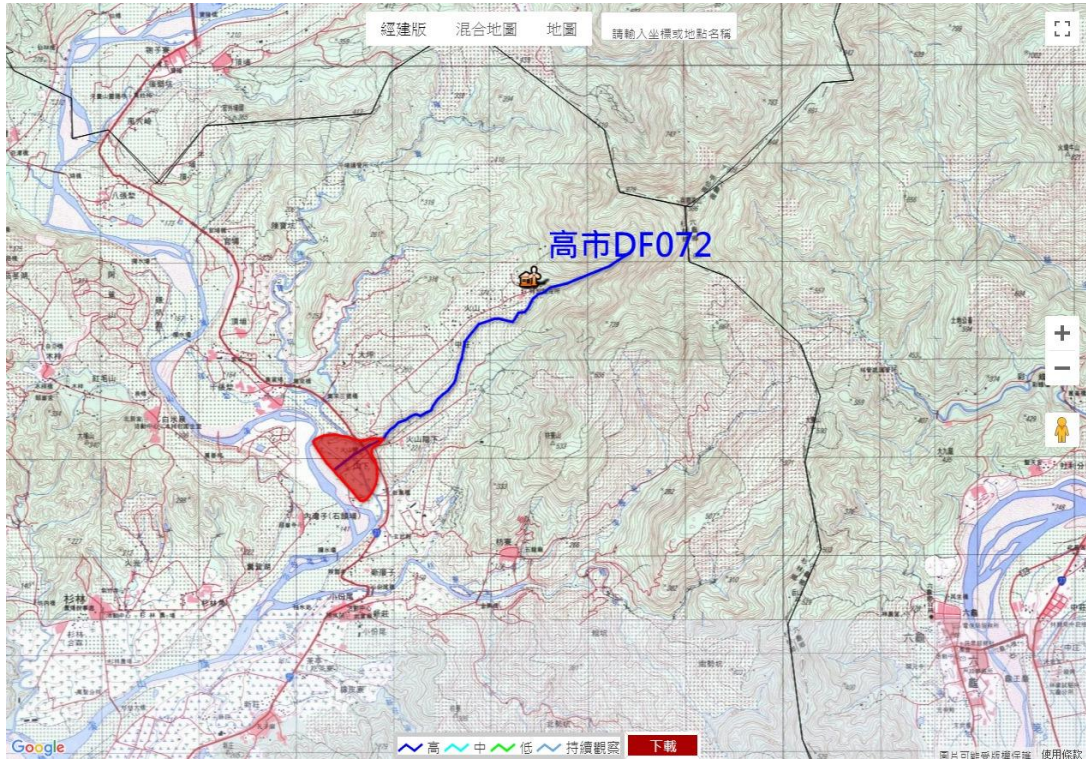
- (5) Steel wire (up) was fractured at downstream. (9/19 22:45)
2. The extremely heavy rain on June 10, 2012. Jilai occurred flooding.
 - (1) Accumulated precipitation risen to the warning (6/11 03:24).
 - (2) Steel wire (down) was fractured at upstream. (6/11 10:19)
 3. In 2012, typhoon Talim caused Jilai debris flow.
 - (1) Accumulated precipitation risen to the warning (6/20 18:54).
 - (2) Steel wire (up) was fractured at upstream. (6/20 13:38)
 4. In 2013, typhoon Trami caused Jilai flooding.
 - (1) Accumulated precipitation risen to the warning. (8/22 16:12)
 - (2) Steel wire (down) was fractured at upstream in Huoshan bridge creek. (8/22 16:05)
 5. In 2013, typhoon Kong-rey caused Jilai flooding.
 - (1) Accumulated precipitation risen to the warning. (8/29 12:13)
 - (2) Ground vibration occurred obvious reaction in downstream. (8/29 13:36)
 - (3) Steel wire (up) was fractured at upstream in Huoshan bridge creek. (8/29 14:00)
 - (4) Steel wires (up and down) were fractured at downstream in Huoshan bridge creek. (8/29 14:00)
 6. In 2015, typhoon Soudelor caused Jilai flooding.
 - (1) Accumulated precipitation risen to the warning.
 - (2) Steel wire (down) was fractured at downstream in Huoshan bridge creek. (08/09 02:29)
 7. In 2016, typhoon Nepartak brought strong wind in Jilai and caused steel wire (down) was fractured at upstream in Huoshan bridge creek. (07/08 11:27)
 8. The extremely heavy rain on July 10, 2016. Jilai accumulated precipitation risen to the 350mm warning. (07/12 07:24)
 9. In 2016, typhoon Megi caused Jilai flooding.
 - (1) Steel wire (down) was fractured at upstream in Huoshan bridge creek. (09/28 03:16)

	<ul style="list-style-type: none">(2) Steel wire (up) was fractured at downstream in Huoshan bridge creek. (09/28 03:41)(3) Steel wire (down) was fractured at downstream in Huoshan bridge creek. (09/28 03:42)(4) Steel wire (up) was fractured at upstream in Huoshan bridge creek. (09/28 03:46)(5) Accumulated precipitation risen to the 350mm warning. (09/28 03:46) <p>10. In August 23, 2018. Tropical Depression caused Jilai flooding.</p> <ul style="list-style-type: none">(1) Accumulated precipitation risen to the warning.(2) Steel wire (down) was fractured at upstream in Huoshan bridge creek. (8/23 13:47:30)
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Note: $\text{Landslide rate} = \frac{\text{landslide in watershed area}}{\text{watershed area}}$

Geographical position map

Basic topographic map



Three-dimensional map



The instrument erection of Jilai station

Position map of instrument erection

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Jilai
Debris Flow Monitoring Station

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農業部農村發展及水土保持署
Agency of Rural Development and Soil and Water Conservation, MOA

土石流觀測站

高雄市杉林區集來里



火山橋野溪
Huoshan Bridge Wild Stream

暴格克颱風造成道路、建物、引水溝損壞，農路上下連續崩塌、滑動，橋面及堤土崩斷裂損壞，導致上方部分房屋基礎掏空，道路損壞 500 公尺，造成火山橋野溪，距火山橋 100 公尺處有 9 戶房屋損毀。

Typhoon Morakot had seriously damaged the agricultural roads. The damage included broken traffic, landslides, and blocked drainage. The slopes along the roads had softened and slid down, causing cracks on the road surface and retaining structures, foundation out, broken road of 500 m, and the breakdown of Huo-Shan Bridge. Nine resident houses were also damaged 100 m away from Huo-Shan Bridge.

資料接收中心 | Data Center

接收即時影像、即時數據、即時警報，提供即時影像及數據，並提供即時警報，提供即時警報。

To receive and record data from sensors and cameras, and provide a power and data transmission system, providing immediate warning center.

CCD 攝影機 | CCD Camera

即時監控現場影像，提供即時影像，提供即時警報。

To monitor the site and provide real-time image for immediate warning.

鋼索感知器 | Wire Sensor

利用鋼索感知器感知土石流之位置，提供即時警報。

The wire sensor can detect the debris flow, which can detect debris flow of a debris flow, which can detect debris flow.

雨量計 | Rain Gauge

即時監控現場降雨量，提供即時警報。

To monitor the amount of rain, which can detect debris flow.

土壤含水量感知器 | Soil Moisture Sensor

即時監控現場土壤含水量，提供即時警報。

To monitor the amount of soil moisture, which can detect debris flow.

地震感知器 | Geophone

即時監控現場地震量，提供即時警報。

To monitor the amount of seismicity, which can detect debris flow.

Instrument description of Jilai station

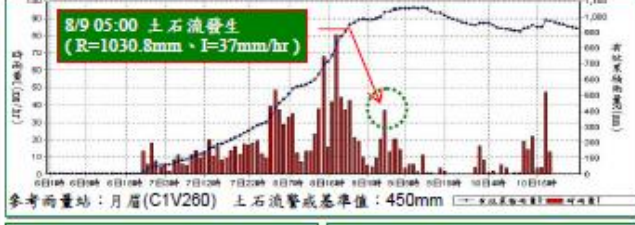
Instrument name	Purpose	Quantity
CCTV	Monitoring the live situation of river, gather the information of real-time image on site.	4
Rain gauge	Measuring the local rainfall of monitoring station to be an important basis for release the debris flow warning.	1
Wire sensor	The impact of debris flow fractured the steel wire and send out the debris flow warning, which can obtain the time data of debris flow.	2
Geophone	Surface vibration caused by the rolling of debris flow is measured by the geophone. If the vibration frequency exceeds the warning value, the system will automatically sends the warning message.	2
Soil moisture meter	The soil moisture meter can record the water saturation of soil, provide the different soil and the relationship between moisture content with debris flow analysis research.	1

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98年莫拉克颱風重大土石災例最速報

98年莫拉克颱風

高雄縣—杉林鄉集來村

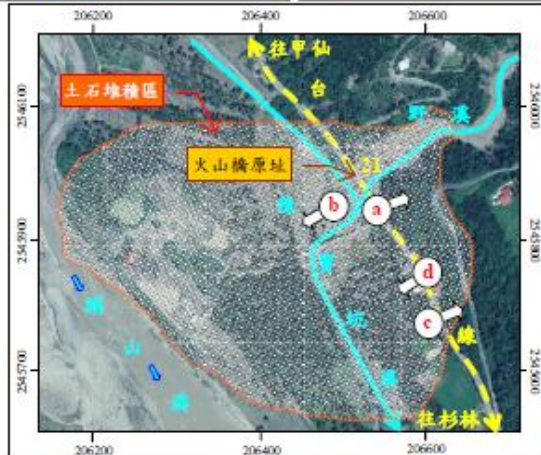


98年莫拉克颱風-高雄杉林-001

- 災區位置：杉林鄉集來村(火山橋)
- 災害發生時間：8月9日5時
- 災害類型：土石流(高雄DF020)
- 有效累積雨量：1,030.8mm

災情描述與統計：

- 8月9日清晨爆發土石流，土石侵入多處民宅，所幸人員已事前疏散，並未造成人員傷亡。
- 房屋受損：13棟。
- 道路毀損：500公尺。



註：坐標採 TWD97 系統，持局土石流防災資訊網「水土保持」

