



RAINSAT

rainfall observations and nowcasting in Africa

November 2nd, 2020

Content

Flash floods in Africa

Precipitation data

Meteosat Second generation

Rainsat – observations

Rainsat – nowcasting

Rainsat – next steps

Flash floods in Africa

Algeria – Deadly Flash Floods Hit Northern Provinces

9 SEPTEMBER, 2020 BY [FLOODLIST NEWS IN AFRICA, NEWS](#)

f t g+ p in

Sudan – State of Emergency Declared as Floods Affect Over 500,000

8 SEPTEMBER, 2020 BY [FLOODLIST NEWS IN AFRICA, NEWS](#)

Ethiopia – 300,000 Displaced by Floods, Says UN

11 SEPTEMBER, 2020 BY [FLOODLIST NEWS IN AFRICA, NEWS](#)

f t g+ p in

Tunisia – Floods Leave 6 Dead After Days of Heavy Rain

13 SEPTEMBER, 2020 BY [FLOODLIST NEWS IN AFRICA, NEWS](#)

f t g+ p in

Mauritania – Deadly Floods in South and East

14 SEPTEMBER, 2020 BY [FLOODLIST NEWS IN AFRICA, NEWS](#)

f t g+ p in

Flash floods in Africa

Algeria – Deadly Flash Floods Hit Northern Provinces
19 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Guinea – 50,000 Affected by Floods in Kankan
8 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Sudan – 166,000 Houses Damaged or Destroyed by Floods
26 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Ethiopia – 300,000 Displaced by Floods, Says UN
11 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Tunisia – Floods Leave 6 Dead After Days
13 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Uganda – Deadly Flash Floods in Kampala
13 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Ghana – Deadly Flash Floods in Ashanti Region
27 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Mauritania – Deadly Floods in Southern Part
14 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Mozambique – Storms and Floods Leave 22 Dead, Thousands Affected
22 OCTOBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Flash floods in Africa

Guinea – 50,000 Affected by Floods in Kank
Cape Verde – Deadly Flash Floods in Praia

15 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Algeria – Deadly Flash Floods

Sudan – 166,000 Houses Damaged or Destroyed by Floods

26 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Ghana – Flash Floods Cause Traffic Chaos in Accra

Ethiopia – 300,000 Displaced

10 OCTOBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Tunisia – Floods

Uganda – Deadly Flash Floods in Kampala

Ghana – Deadly Flash Floods in Ashanti Region

DR Congo – 11 Dead, Many Missing After Flash Floods in North Kivu

27 SEPTEMBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Mauritania – Deadly Flash Floods Leave 22 Dead, Thousands Affected

10 OCTOBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Tanzania – 12 Killed in Dar Es Salaam Flash Floods

16 OCTOBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

22 OCTOBER, 2020 BY FLOODLIST NEWS IN AFRICA, NEWS

Flash floods in Africa

Guinea – 500 ...

Cape Verde – Deadly Flash Floods in Praia

15 SEPTEMBER, 2020 BY [FLOODLIST NEWS](#) IN [AFRICA](#), [NEWS](#)

Algeria

9 SEPTEMBER,

Sudan – 166,000 H...

26 SEPTEMBER, 2020 BY [FLOO](#)

Ghana – Flash Floods Cause Traffic Chaos in Accra

f t g+ p in

g+ p in

10 OCTOBER, 2020 BY [FLOODLIST NEWS](#) IN [AFRICA](#), [NEWS](#)

f t g+ p in

ods Affect Over

Ethiopia – 300,000 DI

f t g+ p in

Tunisia – Flo

Uganda – Deadly Flash Floods in Kampala

11 SEPT

Ghana – Deadly Flash

27 SEPTEMBER, 2020 BY [FLOODLIST NEWS](#) IN [AFR](#)

DR Congo – 11 Dead, Many Missing After Flash Floods in North Kivu

Mauritania – Deau...

f t

Tanzania –

Mozambique – Storms and Floods Leave 22 Dead, Thousands Affected

f t g+ p in

g+ p in

16 OCTOBER, 2020 BY [FLOO](#)

22 OCTOBER, 2020 BY [FLOODLIST NEWS](#) IN [AFRICA](#), [NEWS](#)

f t g+ p in

Flash floods in Africa

Guinea – 50 ...

Cape Verde – Deadly Flash Floods in Praia



Flash Flood Accra
October 10th

Precipitation data for flood early warning

Precipitation measurements:

- unavailable,
- unreliable,
- insufficient coverage,
- insufficient resolution (spatial and temporal),
- too long latency...



Source: https://commons.wikimedia.org/wiki/File:Masera_rain_gauge.jpg

Data

Meteosat (SEVIRI)

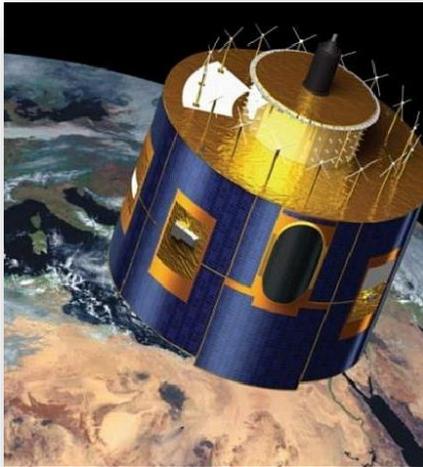
- **Region:** Africa and Europa
- **Latency:** 45 min.
- **Temp. res.:** 15 min.
- **Spat. res.:** ~3x3 km



Data

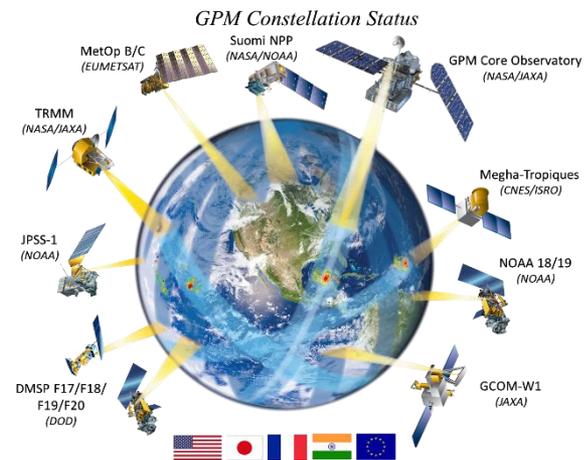
Meteosat (SEVIRI)

- **Region:** Africa and Europa
- **Latency:** 45 min.
- **Temp. res.:** 15 min.
- **Spat. res.:** $\sim 3 \times 3$ km



GPM

- **Region:** Global
- **Latency:** some hours
- **Temp. res.:** 30 min.
- **Spat. res.:** $\sim 10 \times 10$ km

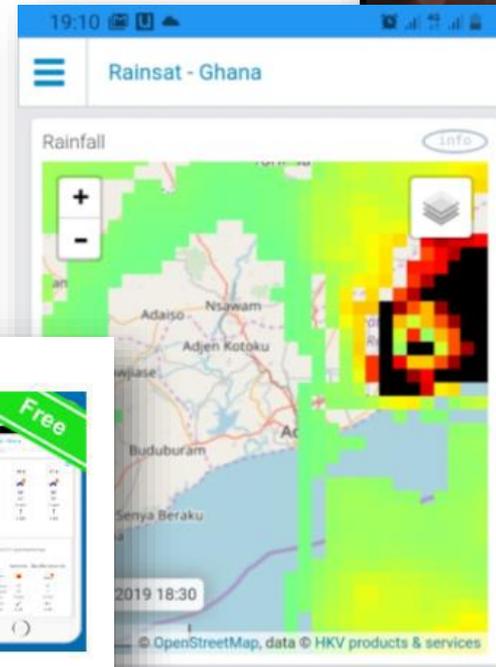
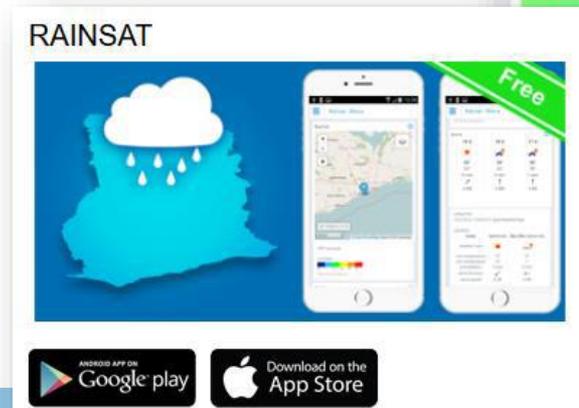
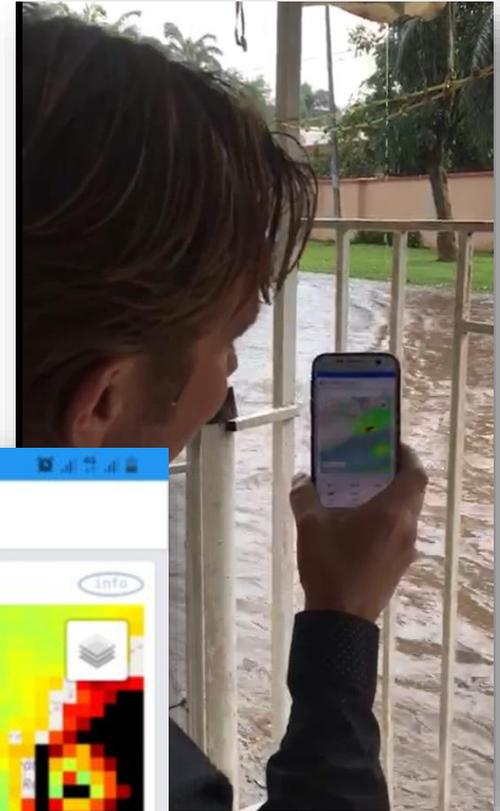


RAINSAT

HKV & KNMI, since 2014

Webpage: rainsat.net

App in Play Store/App Store

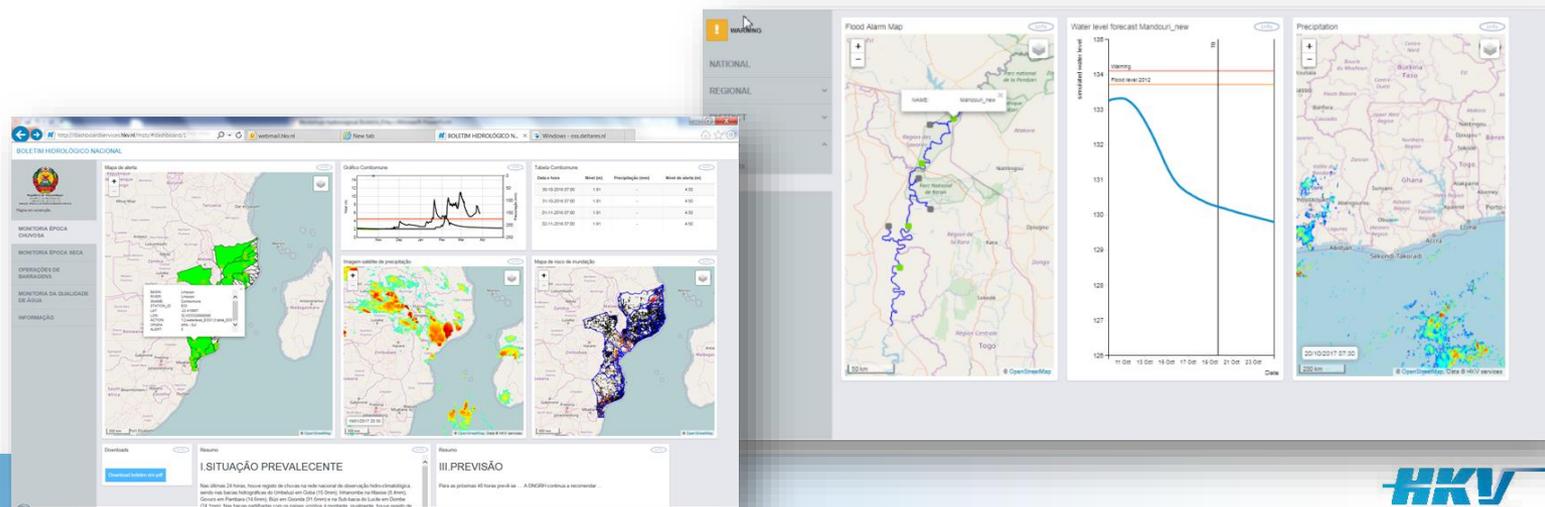


Users

- Meteorological institutes
- Hydrological institutes
- Disaster management organizations

in Ghana, Mozambique, Malawi, Togo

Flood Early Warning Systems & Dashboards



Nowcasting with RAINSAT

Relevant for flash floods:

- 0-3 hours ahead
- convective rainfall events
- current nowcasting methods do not capture convective rainfall

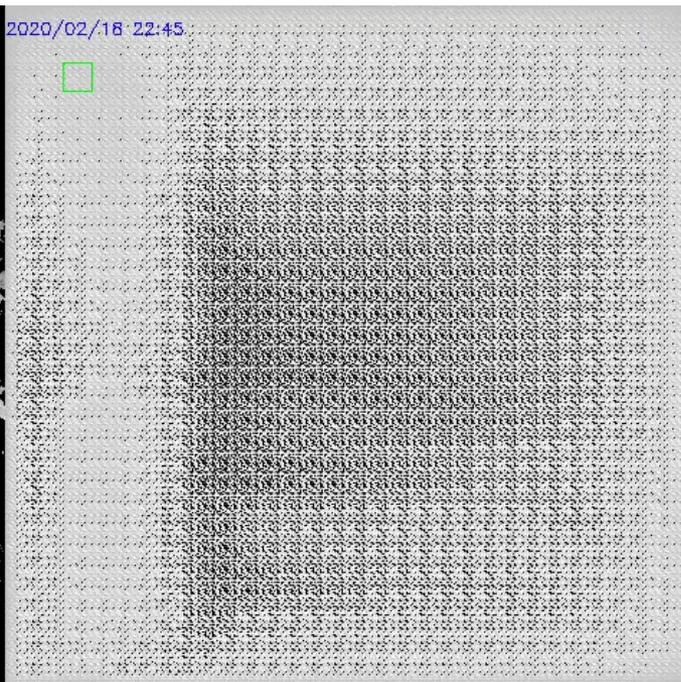
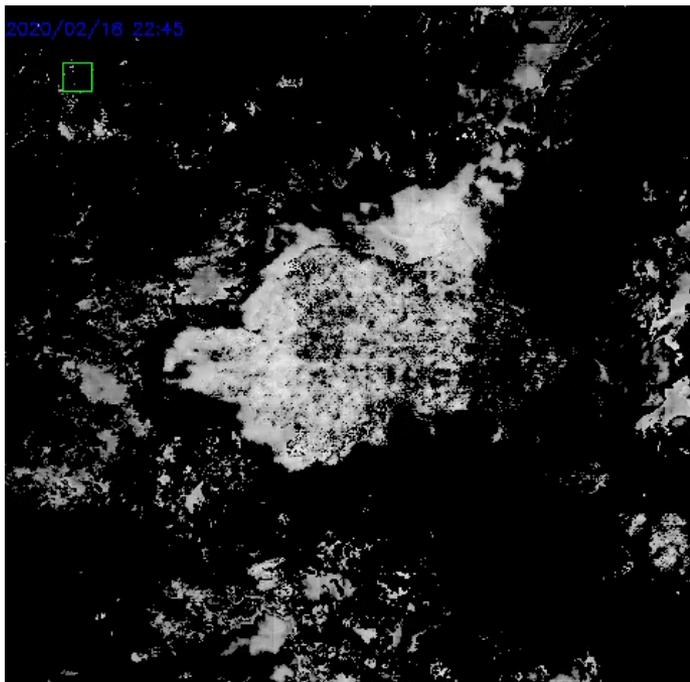


Nowcasting with Neural Networks

Shi et al., 2017, *Deep learning for precipitation nowcasting: A benchmark and a new model.*

- Decreasing and increasing intensity
- Location-specific training; relief, coast, rainforest...

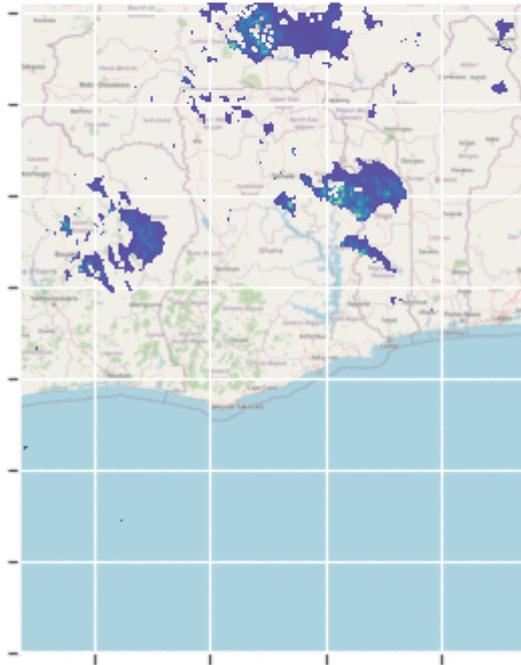
Will it work...?



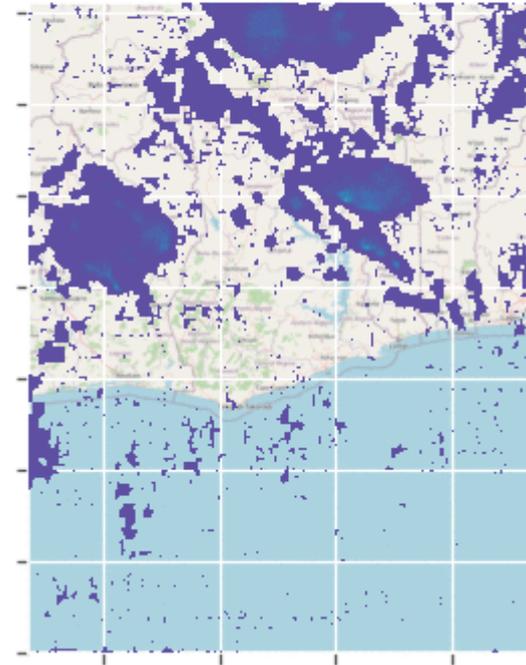
Results

2020-04-10 19:15:00

observation



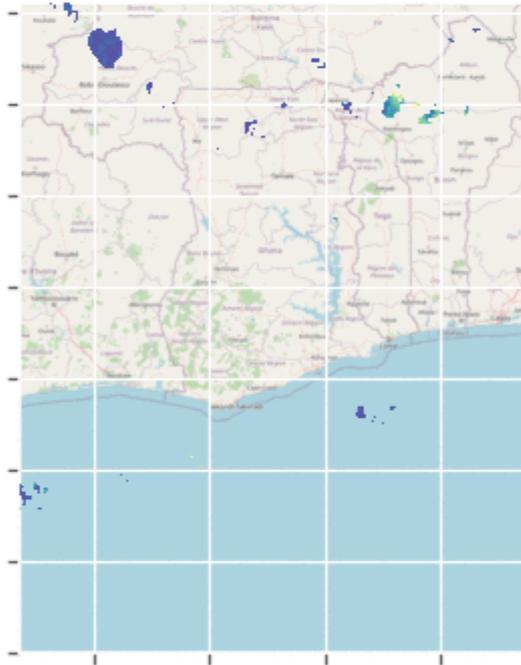
forecast



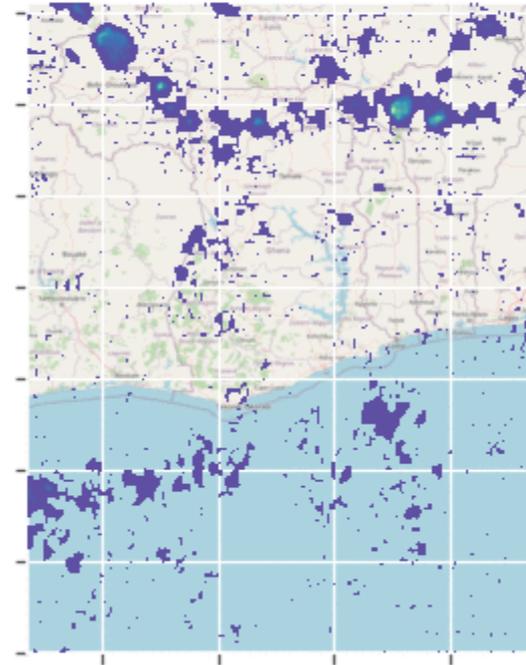
Results

2020-04-20 15:15:00

observation



forecast



Next steps for developments..

Enhance nowcasting:

- Generate extra training data
- Add other parameters
- Enhance machine learning algorithm

Enhance observations

- Calibration / data assimilation with ground stations
- Meteosat Third Generation (even finer spat. and temp. res.)

Our aim:

provide better and earlier warnings for flash floods..!

Contact

Dorien Lugt
Water and Climate
lugt@hkv.nl
+31 6 301718161



Webpage: rainsat.net
App store / Play Store

www.hkv.nl
info@hkv.nl
+31(0)320 294242



2020-04-10 19:15:00

observation

forecast

