Abstract. Some of the most extreme thunderstorms on the planet routinely occur in the Hindu-Kush Himalaya (HKH) region—where many government organizations lack the resources needed to fully assess the risk associated with hazards that result from high impact convective weather. This project combines innovative numerical weather prediction, satellite-based precipitation and land imagery techniques into a high impact weather assessment toolkit (HIWAT) that is building the capabilities of national meteorological departments and other weather sensitive agencies in the HKH region to predict, observe and effectively respond to threats and impacts posed by thunderstorms that affect the region, thereby enhancing extreme weather resilience in the region.

Intense Thunderstorm Activity in the HKH Region

Annual climatology of large hail detected with AMSR-E

(Adapted from Cecil & Blankenship 2012)

HIGH IMPACT WEATHER ASSESSMENT TOOLKIT (HIWAT)

REGIONAL WRF MODEL
HIGH IMPACT WEATHER ENSEMBLE DIAGNOSTICS

Situation Awareness

GPM SATELLITE OBSERVATIONS
SATELLITE LAND IMAGERY

Threat Assessment
Impact Assessment

EXTREME WEATHER RISK ASSESSMENT USE CASE: 30 March 2018

E1. Hazardous Weather Forecast

→ Ensemble WRF forecasts intense thunderstorms across eastern Nepal, northern Bangladesh and NE India.
→ Main hazards: Lightning, Hail, Damaging Winds

2. Near-Real Time Observations

→ Large hail-producing thunderstorms moving N->S across eastern HKH region

Large Hail Probability Maps

GPM Passive Microwave Measurement @ 37GHz

AMS R2
0720 UTC

GMI
0805 UTC

MICROWAVE T_B measurement translated to hail probability (Bang & Cecil 2018)

ENTLN NRT
30 March 2018

Satellite snapshot of total lightning activity

Daily summary of lightning activity

ISS-LIS
1030 UTC

SEVERE WEATHER REPORTS
(30 March 2018)

Ensemble-based numerical weather prediction combined with near-real time satellite observations over a data sparse region presented efficiently, enhances extreme weather resilience in the HKH region.

Ongoing Activities:
• HIWAT validation
• End-user evaluation
• Training
• Pathway to implementation

CONTACT INFORMATION: Patrick.Gatlin@nasa.gov

ACKNOWLEDGMENTS: This project is funded by NASA's SERVIR mission managed by Nancy Searby at NASA HQ in Washington, D.C. We would like to thank the SERVIR Science Coordination Office at NASA MSFC for their assistance with engaging the SERVIR-Himalaya regional hub.