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Damages of Noru Storms in Vietnam - Typhoon Actives on the East Sea

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Abstract: This study will analyze **Damages of Noru Storms in Vietnam - Typhoon Actives on the East Sea**. By using historical data and information, together with related studies, the study showed that: the temperature heterogeneity in the directions around the center of the storm. Flooding also made 11,435 ha of rice and crops; more than 3,800 hectares of industrial, fruit, annual and perennial crops; nearly 135 hectares of forest; over 9,000 hectares of ponds and lakes; more than 710 tons of salt were damaged; 155,340 cattle and poultry were killed or swept away; 127 school sites were affected, Conte & Kelly (2018) showed A fat-tailed storm damage distribution poses a number of challenges. Mean storm damages, an important consideration in insurance pricing, are more difficult to estimate when damages are drawn from a fat-tailed distribution, because extreme values (e.g. catastrophic storms), for which relatively few observations exist, exert strong influence on the estimate of the mean. Identifying welfare-enhancing policies in such an environment requires an empirical and theoretical understanding of the determinants of the existence and mass of the fat tail in the damage distribution.

Keywords: Damage of Typhoon, Storms, Noru, Vietnam East Sea.

INTRODUCTION

Noru is forecast to be one of the strongest storms in the past 20 years; Ha Tinh: Coastal patrol road landslide, relocated 13 households to a safe place; Ferry sank in Bangladesh, at least 23 people died.

At about 1 p.m. on September 28, the storm's center was located on the mainland of Thua Thien Hue - Binh Dinh. The strongest wind in the area near the center of the storm is strong at level 8 (62 - 74km/h), level 10.

Due to the influence of the storm, from the afternoon of September 25, in the eastern seaboard of the North and in the middle of the East Sea, the wind gradually increased to level 8-9, then increased to level 10-11, the area near the center of the storm passed through a strong storm. 12-13, level 16. The sea waves are 6-8m high, the area near the storm center is 8-10m high, the sea is fierce.

This is a very strong storm with a fast moving speed, which is forecasted to make landfall in the central region, possibly causing heavy rain, followed by tube floods, flash floods and landslides.

In the past 3 days, the coastal provinces from Thai Binh to Ha Tinh and the South Central region had heavy rain of 100-250mm, some heavy rain stations such as Sam Son (Thanh Hoa) 332mm, Quynh Luu (Nghe An) 288mm, Xuan Binh (Phu Yen) 233mm.

Li *et al.* (2020) introduce a novel method to accurately evaluate the satellite-observed sea surface temperature (SST) cooling induced by typhoons with complex tracks, which is widely used but only roughly calculated in previous studies.

Hence we choose this topic:

Damage of Typhoon in Vietnam - Typhoon Actives on the East Sea under Influence of Cold Air

METHODS

The study used analysis and evaluation of the evolution of the 24-hour sea level barometric value in the region. Then also using historical data and information, together with related studies.

MAIN FINDINGS

Typhoon Noru (Korean: 노루, meaning buck or roe deer, Vietnamese transliteration: Noru), also known as Typhoon Karding, Super Typhoon Noru or Typhoon No. 4 of 2022, was a super typhoon. Formed from the east of the Philippines. The typhoon made landfall in the Philippines on the afternoon of September 25 and entered the East Sea on the early morning of the 26th of the same month, then moved towards Central Vietnam and made landfall on September 28, 2022. Report the level of disaster risk in four provinces: Da Nang, Quang Nam, Quang Ngai, Binh Dinh at level 4.

Typhoon Noru formed from a low pressure area off the coast of the Philippines, strengthened into a tropical depression on September 22, and continued to strengthen into a typhoon on September 23.

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At 5:00 p.m. on September 25, the center of the storm was in the Polillo Islands, with sustained winds of 195 km/h, gusting at 240 km/h

In the early morning of September 26, Typhoon Noru passed the Philippine island of Luzon and entered the East Sea. The strongest wind in the area near the center of the storm is strong at level 12-13 (118-149km/h), level 14.

At 4:00 am on September 27, Typhoon Noru was active in the southeast sea of the Paracel Islands. The strongest wind at level 14, jerk level 16, increased by one level compared to 8 hours ago. This is considered the strongest storm in the past 20 years since Typhoon Xangsane in 2006 made landfall directly in Da Nang city.

As of 5:30 p.m. on October 2, floods in Nghe and Ha Tinh provinces have killed 8 people); 26 houses with over 70% damage; 143 houses were damaged, roofs were blown off...

In addition, according to the statistics of the Standing Office of the National Steering Committee for Natural Disaster Prevention and Control and the VNA correspondent in the localities, there are 55 houses affected by landslides; more than 2,000 households have to be relocated; 14,033 houses in Nghe An, Ha Tinh, Thanh Hoa were flooded, currently the water is receding slowly.

Flooding also made 11,435 ha of rice and crops; more than 3,800 hectares of industrial, fruit, annual and perennial crops; nearly 135 hectares of forest; over 9,000 hectares of ponds and lakes; more than 710 tons of salt were damaged; 155,340 cattle and poultry were killed or swept away; 127 school sites were affected, 4 meeting rooms had their roofs blown off; 9,150 m of canals; 26 small dams were damaged; 82 bridges and culverts were damaged; 1,550 m river bank was eroded; over 75,800 m3 of soil and rock landslides; 112 bridges and culverts were damaged; 29 locations were flooded; 100 positions were eroded; 51 electric poles, over 5,500m of fence walls fell…

Particularly in Nghe An, at 19.15 on September 29, 2022, there was a case that the dyke section in hamlet 7, Hung Dao commune, Hung Nguyen district separating Lang Can river and hamlet 7 broke a section about 4- 4. 5m due to the large difference in water level between inside and outside the dyke, fast-flowing water faces many difficulties in rescue work to overcome the consequences of dyke breakage. This is an important dyke line, protecting nearly 1,700 households (about 6,000 people).

For nearly 6 hours, hundreds of officers and soldiers of the Army, police and people did not mind the difficulties of immersing themselves in deep water, driving piles, covering nets, transporting soil and rocks to prevent water, and patching sections broken dyke. By 6 a.m. on September 30, the broken dyke had basically been repaired, ensuring the safety of life and property for people in the vicinity. From September 28 to October 2, the total common rainfall in the province is from: 250-500mm. Particularly in Quynh Luu district 672 mm, Thanh Chuong: 575 mm. On the morning of October 2, in Ky Son district, there was local heavy rain, causing flash floods, which buried dozens of houses and caused flooding in Ta Ca commune and Muong Xen town. (Source: wikipedia.org)

DISCUSSION AND CONCLUSION

Annika & Emma (2004) pointed although tropical storms can cause severe damage to the country and especially to the people living in the coastal areas, we have limited our study to concern typhoons only. This means that storms with wind speed lower than 32.7 m/s will not be taken into account in our calculations.

Fig 1. Noru causes Damage in Ha Tinh province
Source: Daidoanket Newspaper

Garner *et al.* (2017) pointed that multiple studies document sea-level-rise-driven increases in the frequency, peak height, and damages of historical coastal floods. Most of this research assumes a simple linear addition of sea level rise to water levels, without any hydrodynamic modeling to capture observed nonlinear effects. None of it, to our knowledge, isolates the effect of the climate-mediated human contribution to sea level rise from other factors such as natural variability and local vertical land motion.

Conte & Kelly (2018) mentioned The distribution of the number of properties within a random geographical area that lies in the path of a tropical cyclone is shown to drive fat tailed storm damages, and we confirm that the distribution of coastal city population is fat tailed in the US. We show empirically and theoretically that other random variation, such as the distribution of storm strength and the distribution of damages across individual properties, does not generate a fat tail. We consider policy options such as climate change abatement, policies which encourage adaptation, reducing subsidies for coastal development, and disaster

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relief policies, which distort insurance markets. Such policies can reduce the thickness of the tail, but do not affect the shape parameter or the existence of the fat tail.

A fat-tailed storm damage distribution poses a number of challenges. Mean storm damages, an important consideration in insurance pricing, are more difficult to estimate when damages are drawn from a fat-tailed distribution, because extreme values (e.g. catastrophic storms), for which relatively few observations exist, exert strong influence on the estimate of the mean. Similarly, the expected damage from a catastrophic storm (e.g., a once-in-a-hundred-years storm), is also more difficult to estimate, meaning that regulators must require insurers to hold larger minimum levels of reserve capital. It is also well known that insurance firms must hold more costly reserves when the estimate of the damages from a catastrophic storm is uncertain. The cost of holding reserves is passed on, in the form of higher premiums, to policyholders, who may respond by not fully insuring (Kousky and Cooke, 2012)

Author's Contribution

Developing ideas and choosing research methods: Huong C.T.T.; Data analysis and processing: Huong C.T.T.; Linh T.D..; Writing the manuscript: Huong C.T.T.; Linh T.D.; Revised: Dinh, T.N.H
Editing of the article: Huong C.T.T.

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Conflicts of Interest

The authors declare no conflict of interest.

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