Analysis of the concentration of TV news coverage to the specific municipalities on the 2011 off the Pacific coast of Tohoku Earthquake

Muneyoshi Numada
Research Associate, Institute of Industrial Science, The University of Tokyo, Japan

Kimiro Meguro
Professor, Institute of Industrial Science, The University of Tokyo, Japan

SUMMARY
In the 2011 off the Pacific coast of Tohoku earthquake, we observed a concentration of news coverage on the damage and disaster response activities of specific municipalities and a high emphasis on the nuclear power plant accident. The concentrated news coverage induced the concentration of aid activities such as distribution of relief supplies and donations to the specific area. This problem has repeatedly happened in the past disasters. The purpose of this research is to conduct a quantitative analysis of the municipalities that were repeatedly covered by the TV news reports during the emergency period after the Tohoku earthquake. This research defined the media coverage rate on municipalities in order to analyse the relationship between the amount of media coverage and the level of damage caused by the disaster. The result showed that even if the damage level is equally high, there was a difference in the amount of TV news coverage among the municipalities.

Keywords: The Pacific coast of Tohoku Earthquake, Concentration of news program, TV program, Disaster information

1. INTRODUCTION

At 14:46 JST (5:46 UTC) on March 11th, 2011, an earthquake of a moment magnitude 9.0, the largest earthquake ever recorded in Japan, struck off the shore of the Sanriku area in the Tohoku Region. The following “mega tsunami” hit deeply indented coastal areas and brought extensive and devastating damage to many cities and villages in this area. Mega tsunami damage was not only limited to buildings, but the resulting fires destroyed many communities and nuclear power plant (NPP) facilities have suffered complicated and serious damage. This earthquake was later named “The 2011 off the Pacific coast of Tohoku Earthquake” by the Japan Meteorological Agency (JMA).

In this earthquake, it was difficult to grasp the full scope of the disaster since the damage was widespread and diverse. In order to obtain information about the damage condition, safety confirmation, news and announcement from municipalities, a variety of media, not only conventional tools such as television, radio and the Internet but also new types of information-sharing tools such as Twitter and Facebook were used. Also the Internet TV news sites such as USTREAM and NICO-NICO DOUGA were able to broadcast programs from NHK (Japan Broadcasting Corporation) and commercial TV stations at no charge. In addition, people could watch the TV programs in the open air by receiving one-segment broadcasting services.

According to the survey (Nomura Research Institute, Ltd. 2011) on trends in media contact associated with the 2011 off the Pacific coast of Tohoku earthquake, TV was ranked no.1 and no.2 as an important source of information, as 80.5% of the people considered “information from TV coverage (NHK)” and 56.9% considered “information from commercial TV stations” as important in acquiring information about the earthquake. And “information from the newspaper” and “information from the portal sites on the I3nternet” ranked after TV. In addition, according to the survey (My Voice Communications, Inc. 2011) on "How one gathered information about the 2011 off the Pacific coast of

Tohoku earthquake", the TV was ranked top as 93.5% of the people chose TV, 44.9% chose newspapers,44.8% chose internet news sites, 42.8% chose portal site (such as Yahoo) and 31.1% chose radio. From these results, it is evident that many people used TV as a main tool for obtaining information.

According to the article 108 of the Broadcasting Act and Disaster Countermeasure Basic Act (Tanaka 2008) broadcasting organizations are obliged to provide useful services in order to prevent and reduce the disaster. Also, the Ministry of Internal Affairs and Communications requested NHK and the National Association of Commercial Broadcasters in Japan to provide accurate and detailed information to the public as quickly as possible (Ministry of Internal Affairs and Communications 2011).

From these results, it can be said that the TV news is not only to report damage situation but also it is expected to provide useful information that can prevent further damage and contribute to an appropriate disaster management as one of the “disaster prevention organizations”.

In the 2011 off the Pacific coast of Tohoku earthquake, some areas were easily accessible by the news reporters or broadcasted heavily at an early stage which left a strong impact. As a result, some municipalities were intensively covered by the TV news reports than others. There was also a high emphasis on the nuclear power plant accident. It can be said that the news coverage was unbalanced considering the scale of affected areas and as a result it induced the aid activities to be concentrated at certain areas while other areas were neglected, causing unbalanced distribution of relief supplies and donations

Although this problem of media concentration has been repeatedly pointed out (Nakamori 1995) in the past earthquake such as Hokkaido Nansei Oki Earthquake in 1993, Hokkaido Toho oki Earthquake in 1994, and the Southern Hyogo prefecture earthquake in 1995, the same problem occurred again (Nakamori 2011). Unbalanced media coverage on certain topics and areas cannot provide the viewers with comprehensive views and understanding of a total damage especially at the time of such extensive disaster as the Tohoku earthquake. The TV media has a responsibility and an important role to provide information to influence people’s decision-making and proper evaluation.

Previous studies regarding the TV news coverage and its contents after the Tohoku earthquake include the chronological analysis of the contents of TV news (NHK 2011), the verification of early media coverage, the confused reports of the nuclear power plant accident, and the analysis of the foreign media reports (General incorporated association of Tokyo-sya 2011). However, the quantitative analysis of the unbalanced TV news coverage has not yet been conducted.
The purpose of this study is to conduct a quantitative verification of unbalanced media coverage during the emergency period after the Tohoku earthquake. The relationship between the media coverage and the level of damage caused by the disaster for the first 10 days after the disaster was analyzed.

2. TV NEWS DATA

In this study, we selected six major TV stations for the analysis, namely NHK, NTV, TBS, Fuji TV, TV Asahi, and TV Tokyo. In order to analyse the TV contents, normally the text data from each section of the program is required. In this study, we have employed the database called "Document-Analyser" by JCC Corporation. This allowed us to obtain the text data of all six TV stations for 365 days a year, 24 hours a day by the unit of seconds. Also it is possible for us to comprehend when, what, where, and how each TV station did report. **Table 1** shows an example of the text data of NHK on March 12th.

This paper uses the target period of 10 days from March 11th to 20th, considering the importance of the TV news reports in the early stage immediately after the disaster, with regards to the understanding

of damage situation and the level of influence it has on a supply of relief goods. **Figure 1** shows the number of characters obtained from the text data. The number of characters was recorded approximately 100,000 from 11th to 13th of March, but from 14th to 18th, the number was more than doubled to 200,000.

Figure 2 shows the total characters obtained during 10 days from each TV stations. From this figure, NHK has the highest number of characters, followed by TBS and NTV.

Table 1. Example of the text data of the TV program (259 characters)

In Miyagi Prefecture, by the earthquake, 53 people were killed. The details is 17 people in the Higashimatsushima city, 12 people in the Kesennuma city, 8 people in the Shichigahama town and 5 people in the Sendai city. In the coastal town of Minamisanriku where was attacked by the tsunami, many buildings and houses were washed away by the tsunami except the hospital building constracted by concrete, and many people were missing. In the area along with the port of Kesennuma in Kesennuma city, the large-scale fire occurred caused by the outflowing oil from the tank at the port. The video of Kesennuma city. (March 12, NHK)

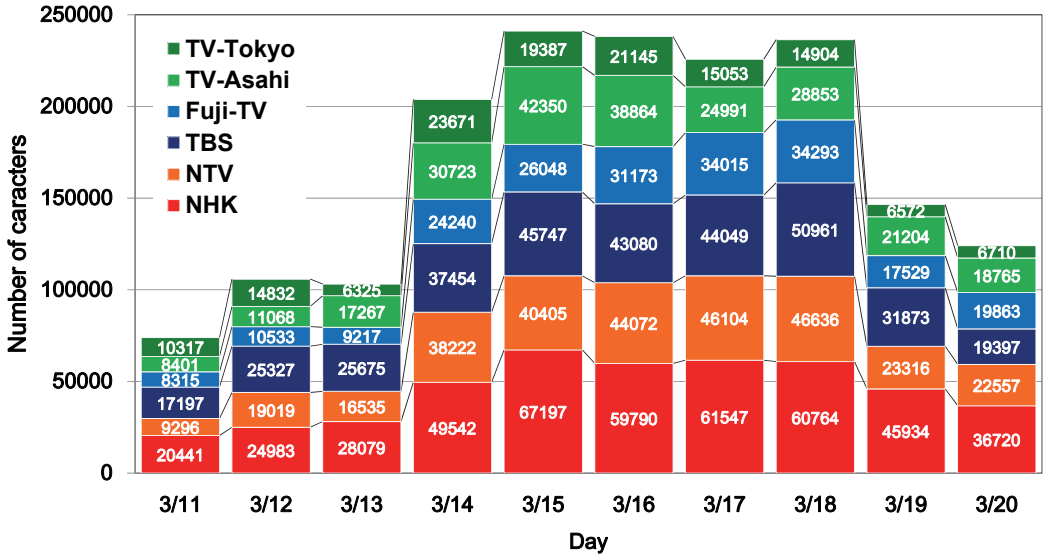


Figure 1. Number of characters of text data of TV news coverage

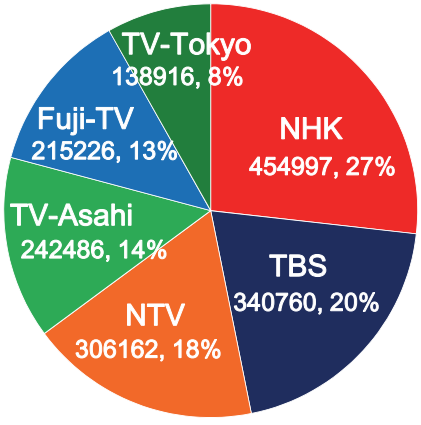


Figure 2. Breakdown of text data of TV news coverage

3. ANALYSIS OF THE CONCENTRATION OF TV

The news programs broadcasted by each TV station were similar and there was no big difference or distinctive characteristic observed from their reports made during 10 days after the disaster.

This chapter analyses how each TV station concentrated its reports on specific municipalities by using the text data. This study defines “concentration-ratio of the news coverage on municipality *C*”. This is indicated by the ratio of "the total number of all the municipalities each TV station picked up" and "the number of each municipality each TV station picked up." Here the definition of the word "picked up” is used when the name of a particular municipality is included in the text data as underlined in **Table 1**. According to this definition, Higashimatsushima city marked “1”, Kesennuma city “4”, Shichigahama town “1”, Sendai city “1”, and Minami-Sanriku town “1” as shown in **Table 1**.

If the index *C* is high, it indicates that the TV station has reported on the particular municipality intensively. On the other hand, if the index *C* is low, it indicates that the particular municipality has not been reported as much. If the index *C* is zero, it indicates that the municipality did not get covered at all.

Table 2 (a) and **(b)** shows the transition of the index *C* in a chronological order. The three prefectures with especially heavy damage - Iwate, Miyagi and Fukushima – are selected to obtain the news reports coverage rate on daily basis. Due to space limitations in this paper, some municipalities with low-value *C* are excluded and the value after the decimal point is omitted.

According to the table, the index *C* of Sendai city is high and it is evident that each TV station concentrated on reporting about Sendai city. For Ishinomaki city, the index *C* varied during the period of 11th to 15th of March however the value became high after the 16th of March. The index *C* of Minami-sanriku town is low during the period of 11th to 12th of March, but the value became high for all the TV stations from 13th to 16th of March. Miyako city was intensively reported from the 11th through 14th of March except for TV Tokyo. Similarly, Ofunato city, Rikuzentakata city, Kamaishi city and Kesennuma city are the cities that were intensively reported by most TV station.
Using this method, we have succeeded to quantitatively evaluate the concentration and disparity of TV news coverage on municipalities by TV stations.

Next, we discuss the relationship between the *C* value and the level of damage. In the previous studies, there has been a quantitative analysis of the relationship between the newspaper coverage and the damage level (Matsumura 1998), however the relationship between the TV report coverage and damage level has not yet been studied. The definition "Earthquake coverage rate" is indicated by the ratio of earthquake related reports in all the news reports in the newspaper excluding advertisement. The result indicates that there is a high correlation to the number of casualties and the “Earthquake coverage rate” rather than to the number of totally collapsed buildings.

Using the above result as reference, this paper analyses the relationship between casualties and the index *C* of TV news coverage. The number of total casualties used here represents the sum of the missing and dead people.

Figure 3 shows the relationship between the casualties and the index *C* on March 11th. In calculating the index *C* here, the total number of news coverage on municipalities from March 11th to 20th is used and the number of casualties referred to those confirmed by March 20th.
Focusing on the municipalities with 1,000 casualties such as Kesennuma city, Kamaishi City, Otsuchi town, Higashimatsushima city, and Yamamoto town, NHK showed the highest number of index *C* for Kesennuma city, followed by Kamaishi city, Otuchi town, Higashimatsushima city and Yamamoto town. This result shows that even though the number of casualties is similar, there is a difference in the amount of TV news coverage on municipalities.

Table 2 (a) Time history of "concentration-ratio of the municipality *C*" (2011.3/11-15)

Pref.	Municipality	2011/3/11						2011/3/12						2011/3/13						2011/3/14						2011/3/15					
		TV station						TV station						TV station						TV station						TV station					
		NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo
Iwate	Morioka city	2	6	3	3	4	0	1	0	0	1	1	0	1	2	0	0	1	0	1	1	2	0	1	3	2	0	1	0	1	0
	Miyako city	4	11	14	6	14	0	5	1	9	8	5	1	7	5	5	7	8	2	1	4	3	5	8	0	2	2	3	7	11	0
	Ofunato city	7	4	3	5	20	5	5	12	3	13	9	3	3	5	1	9	11	4	4	4	6	10	10	16	2	4	5	9	7	0
	Hanamaki city	1	1	3	2	1	5	0	1	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	0	1	0	1	1	0	0
	Kuji city	6	2	3	2	2	0	1	0	0	0	1	0	1	0	1	1	2	0	1	0	0	0	0	0	1	0	0	0	0	0
	Tono city	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rikuzentakata city	0	1	2	1	2	0	7	3	12	6	4	9	9	6	9	6	5	14	9	8	11	6	5	4	7	13	9	6	7	16
	Kamaishi city	6	0	2	1	1	7	3	8	1	0	1	0	4	4	2	1	0	0	7	4	2	2	1	1	2	3	3	4	0	0
	Otsuchi city	0	1	1	0	2	0	2	2	0	1	0	0	3	1	2	3	0	0	1	2	0	2	3	1	1	1	4	5	7	0
	Yamada town	1	4	1	0	2	0	1	0	4	1	0	0	1	1	1	0	0	0	0	0	3	0	1	1	0	0	2	2	1	0
Miyagi	Sendai city	24	21	21	14	23	33	13	18	17	18	22	22	18	6	12	11	10	16	14	11	12	13	12	14	11	13	6	6	7	26
	Ishinomaki city	3	4	1	4	1	0	7	4	3	1	3	1	7	8	5	2	0	6	8	9	5	7	5	5	7	6	6	10	4	0
	Shiogama city	1	0	0	1	7	7	0	0	0	0	2	0	1	0	0	0	1	2	1	0	0	0	1	0	0	0	1	0	0	0
	Kesennuma city	4	1	4	11	1	0	10	8	11	14	10	13	10	9	9	14	8	12	8	8	10	10	12	5	8	13	8	8	14	5
	Natori city	11	0	1	2	0	14	3	5	2	6	7	14	7	4	1	3	5	8	5	4	2	7	7	10	1	1	0	6	12	0
	Kakuda city	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Tagajo city	0	0	1	2	0	7	0	2	1	1	3	0	1	2	1	0	1	0	2	1	1	0	2	0	0	0	2	0	2	5
	Iwanuma city	0	0	0	0	0	0	1	0	2	0	5	1	2	0	3	0	3	0	0	0	1	0	1	0	0	0	0	0	0	5
	Kurihara city	1	1	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	0
	Higashimatsushima	1	0	0	0	1	0	1	0	0	0	3	0	2	2	1	1	8	4	2	4	2	3	7	4	2	1	1	3	1	0
	Watari town	0	0	0	1	0	0	0	0	2	2	0	0	1	0	1	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0
	Yamamoto town	0	0	0	0	0	0	2	0	0	1	0	0	0	0	2	3	0	0	0	0	2	2	0	0	0	0	2	5	0	0
	Matsushima town	1	0	0	0	1	0	1	0	0	0	4	0	2	2	1	1	9	4	2	4	2	3	7	4	2	1	1	3	1	0
	Shichigahama town	0	11	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	1	0	2	0	0	1	5
	Rifu town	1	1	0	1	2	5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Onagawa town	1	4	4	3	5	5	2	0	2	2	1	3	2	2	2	3	1	2	4	2	1	2	2	0	5	1	0	2	2	0
	Minamisanriku town	0	0	0	0	2	0	7	2	6	6	1	3	9	7	13	13	8	12	10	12	14	7	10	13	8	14	10	8	13	26
Fukushima	Fukushima town	1	0	6	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	6	0	0	0	1	1	3	1	1	11
	Aizuwakamatsu city	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0
	Koriyama city	4	8	6	2	1	0	0	0	0	0	2	0	1	1	0	0	1	0	1	1	1	1	0	0	0	3	2	1	3	0
	Iwaki city	4	1	3	6	1	0	3	3	0	0	1	0	3	1	0	2	0	0	1	0	0	4	1	0	7	1	3	3	1	0
	Shirakawa city	2	2	3	3	0	0	2	1	1	6	1	0	1	1	0	4	0	0	0	0	0	0	1	0	1	0	2	0	0	0
	Sukagawa city	1	2	1	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
	Kitakata city	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Soma city	5	2	5	3	0	7	6	8	7	5	5	14	2	2	8	5	3	4	4	2	4	5	2	1	5	2	4	3	1	0
	Nihonmatsu city	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	3	0	1	0
	Tamura city	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	2	0	2	30		0
	Minamisoma city	3	2	4	3	0	0	5	3	7	5	1	12	4	0	7	3	1	0	5	1	4	3	1	1	6	1	3	25		0
	Okuma city	1	0	0	1	0	0	2	4	0	1	0	0	0	2	0	0	1	0	0	2	0	0	0	0	1	1	1	20		0
	Futaba town	0	1	0	1	1	0	3	5	3	1	3	0	1	5	4	3	1	6	0	1	1	1	0	0	0	0	1	15		0
	Namie town	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	2	0	0	0	1	0	2	10		0
	Kuzuo village	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	5		0
	Shinchi town	0	0	0	0	0	0	1	5	1	0	1	0	0	4	0	2	0	2	1	2	0	1	0	0	1	0	1	1		0
	Iidate village	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0

Concentration-ratio of the municipality *C* (%)

Note: The number is rounded off to the closest whole number

Table 2 (b) Time history of "concentration-ratio of the municipality *C*" (2011.3/16-20)

Pref.	Municipality	2011/3/16						2011/3/17						2011/3/18						2011/3/19						2011/3/20					
		TV station						TV station						TV station						TV station						TV station					
		NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo	NHK	NTV	TBS	Fuji	Asahi	Tokyo
Iwate	Morioka city	1	1	1	1	0	0	4	1	0	2	0	6	4	3	2	2	1	0	2	3	3	2	0	0	1	1	1	3	3	0
	Miyako city	7	1	4	8	6	0	3	1	6	8	6	0	1	4	3	5	2	0	2	3	2	8	7	0	1	2	5	3	3	0
	Ofunato city	2	3	5	2	6	0	1	3	4	7	8	0	3	7	4	7	1	0	1	9	1	9	10	7	1	2	1	6	3	0
	Hanamaki city	0	2	0	1	0	11	1	2	1	0	0	0	0	0	4	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
	Kuji city	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3	0	0
	Tono city	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Rikuzentakata city	5	12	8	5	12	0	6	4	6	7	9	0	9	13	10	5	7	0	6	14	8	11	13	7	6	10	12	12	8	16
	Kamaishi city	6	7	5	5	2	0	5	2	7	6	2	6	5	3	7	6	1	8	6	5	8	3	0	3	6	6	9	1	0	0
	Otsuchi city	1	4	5	6	6	0	3	5	2	3	2	0	2	1	2	2	1	0	2	0	5	1	3	0	4	2	5	4	3	0
	Yamada town	2	1	2	9	1	0	2	0	3	6	2	0	4	1	2	0	3	0	5	0	2	1	3	0	2	0	0	1	0	0
Miyagi	Sendai city	11	9	13	8	7	33	10	13	21	15	8	44	8	10	16	14	17	38	7	17	15	13	10	21	10	20	12	13	17	11
	Ishinomaki city	6	10	5	12	5	17	7	12	7	10	4	31	9	8	2	9	8	15	4	9	5	8	3	10	13	6	18	14	17	26
	Shiogama city	0	0	0	0	1	11	1	2	1	0	2	6	1	3	1	0	2	0	0	1	2	0	3	0	0	4	0	0	3	0
	Kesennuma city	8	7	7	9	18	0	7	9	5	4	18	0	6	7	6	9	11	0	5	8	6	12	11	14	8	1	6	4	5	0
	Natori city	0	3	1	1	2	0	0	3	0	1	0	0	1	1	1	1	1	0	0	1	0	1	0	10	1	1	2	0	2	5
	Kakuda city	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tagajo city	0	4	0	2	1	0	1	4	0	2	2	0	0	0	0	0	0	0	0	0	2	0	0	3	1	0	0	1	2	11
	Iwanuma city	0	1	0	0	0	0	1	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Kurihara city	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0	1	1	0	0	3	0	0	0	4	0	0	5
	Higashimatsushima	2	2	1	2	1	0	2	1	1	1	2	0	1	1	0	1	2	0	0	1	0	2	0	3	1	1	0	0	3	0
	Watari town	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	3	1	0	0	0	0	0
	Yamamoto town	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Matsushima town	2	2	1	2	2	0	2	1	1	1	2	0	1	1	1	2	2	0	0	1	0	2	0	3	1	1	0	0	3	0
	Shichigahama town	0	0	0	0	1	11	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0
	Rifu town	1	0	0	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	1	4	0	0	0	0	0	1	0	1	0	0
	Onagawa town	3	2	0	1	0	6	5	2	0	1	0	0	2	2	1	4	2	0	1	2	0	0	0	0	1	0	0	0	2	0
	Minamisanriku town	9	12	15	8	13	11	11	8	6	3	5	0	9	7	4	2	6	0	8	11	7	0	5	10	8	6	9	0	10	11
Fukushima	Fukushima town	2	2	7	4	2	0	2	4	7	6	2	0	4	3	4	2	0	0	1	0	6	2	2	0	2	1	0	1	2	0
	Aizuwakamatsu city	0	1	0	0	0	0	1	0	0	0	2	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	2	0
	Koriyama city	0	5	3	2	3	0	0	0	2	1	2	0	1	2	1	2	1	8	1	0	0	1	2	0	0	0	0	0	0	0
	Iwaki city	3	2	2	0	2	0	9	2	3	5	8	0	13	5	10	6	4	8	5	0	8	3	0	0	1	2	4	7	0	0
	Shirakawa city	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sukagawa city	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kitakata city	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
	Soma city	9	3	3	6	0	0	3	4	7	5	4	0	5	7	4	5	9	0	7	1	3	7	7	0	3	1	1	4	0	5
	Nihonmatsu city	1	0	2	0	3	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	4	0	0	0
	Tamura city	1	1	1	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	1	0	0	30		0
	Minamisoma city	10	3	4	6	0	0	4	3	7	4	4	0	4	7	4	5	9	0	7	1	3	6	7	0	6	1	1	25		0
	Okuma city	0	0	1	1	0	0	1	1	1	1	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	20		0
	Futaba town	0	0	0	0	0	0	1	1	1	1	1	0	3	0	0	0	0	0	9	2	2	1	3	0	9	4	2	15		0
	Namie town	1	0	1	0	0	0	1	0	0	0	0	6	0	0	2	0	0	0	1	0	0	0	0	0	1	6	0	10		0
	Kuzuo village	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5		0
	Shinchi town	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0
	Iidate village	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	1	13	0	0		0

Concentration-ratio of the municipality *C* (%)

Note: The number is rounded off to the closest whole number

Similarly, in Nihon-TV, for the municipalities with 1000 casualties, the index *C* of Kesennuma city shows high value, while Yamamoto town and Higashimatsushima city show relatively low value. The same tendency is observed in other TV stations. This tendency can also be observed from the chronological analysis of **Table 2 (a)** and **(b)**. On March 14th in Higashimatsushima city, 152 dead and 400 missing people were found, likewise on March 15th in Yamamoto town, 111 dead and 638 missing people were found. Despite these findings of high number of casualties, no obvious reaction is observed in the index C.

Figure 4 shows the relationship between casualties and the index *C* of NHK on the day of the earthquake, the third and tenth day from the occurrence of earthquake.
The *C* is calculated by the number of coverage on the day of the earthquake, the sum of the coverage by the third and tenth days since March 11th respectively. The number of casualties used is the sum of dead and missing people on the day of the earthquake, by the third and tenth days since March 11th respectively.

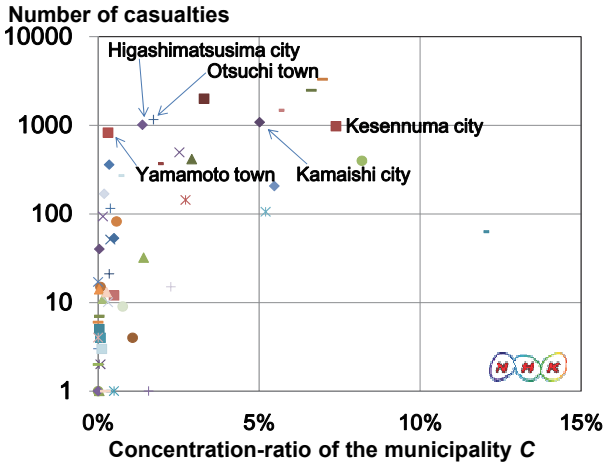
The index *C* of Sendai and Natori city on the day of the earthquake is high, subsequently followed by Ofunato city, Kamaishi city, Kesennuma city, Higashimatsushima city and Yamamoto town. Otsuchi town is not covered at this stage as seen in **Figure 4 (a)**. We will discuss by comparing two municipalities of Kesennuma city and Otsuchi town.
On the third day (**Figure 4 (b)**), both Kesennuma city and Otsuchi town showed increase in the number of casualties, however the index *C* of Kesennuma city has increased while that of Otsuchi town has not changed. By the tenth day since the earthquake, the number of casualties of both Kesennuma city and Otsuchi town reached almost the same level, yet a big difference of index *C* is observed.

These results proved quantitatively that there is a difference in the index *C* despite the fact that the casualty level is the same and it indicated that the news reports coverage is unbalanced. This tendency is common among other TV stations. One of the causes for this may be explained by the accessibility to certain municipalities due to the road condition. However another cause may be that the TV stations have tendency to comply with reports by successful TV stations which managed to deliver news with strong impacts, driven by the mentality to avoid missing out on a scoop. The results of this study are important for it indicated these phenomena by using quantitative analysis.

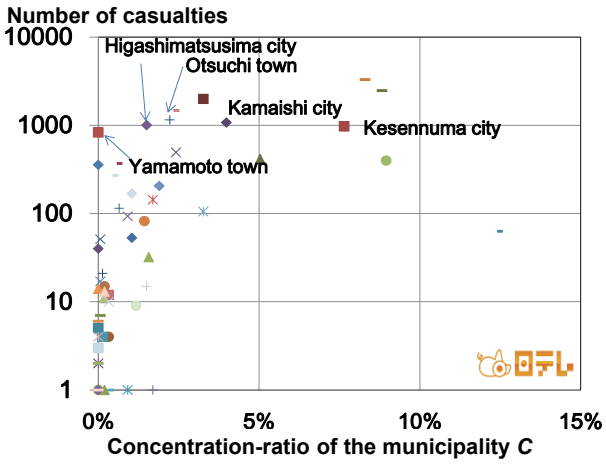
4. CONCLUSION

The concentrated news coverage induced the concentration of aid activities such as distribution of relief supplies and donations to the specific area. This problem has repeatedly happened in the past disasters. This research proved quantitatively that there is a difference in the index *C* despite the fact that the casualty level is the same and it indicated that the news reports coverage is unbalanced. This tendency is common among other TV stations. One of the causes for this may be explained by the accessibility to certain municipalities due to the road condition. However another cause may be that the TV stations have tendency to comply with reports by successful TV stations which managed to deliver news with strong impacts, driven by the mentality to avoid missing out on a scoop. The results of this study are important for it indicated these phenomena by using quantitative analysis.

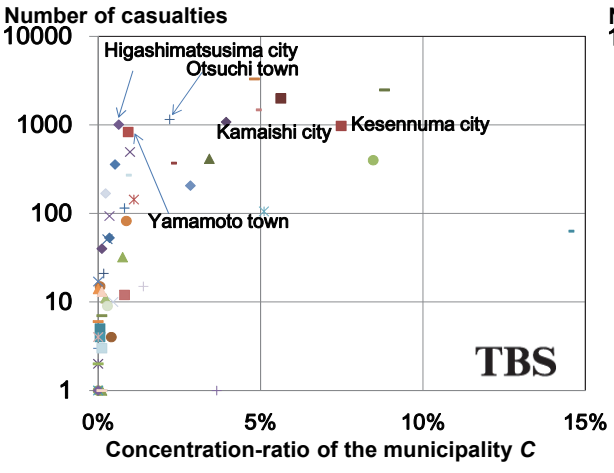
From these results, we propose the following strategy to improve the TV news reports for the next disaster. Under the condition of limited time and human resources of TV stations, it is advisable to (1) grasp the overall damage condition properly, (2) provide information that corresponds to the needs of the audience, and (3) promote the cooperation among the TV stations, with respect to freedom of the press, in order to avoid unbalanced news coverage to specific municipalities and to make it more accessible to obtain necessary information.



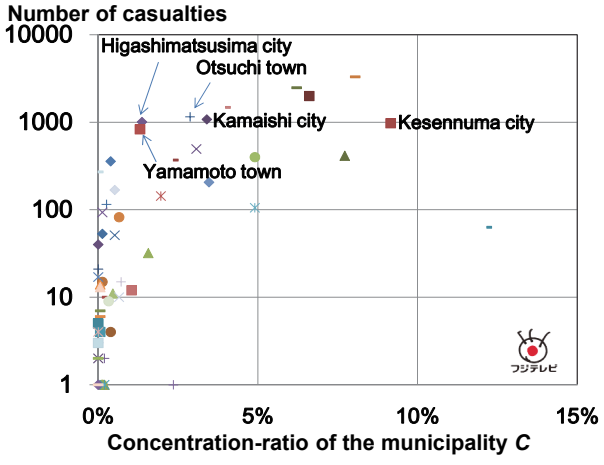
(a) NHK



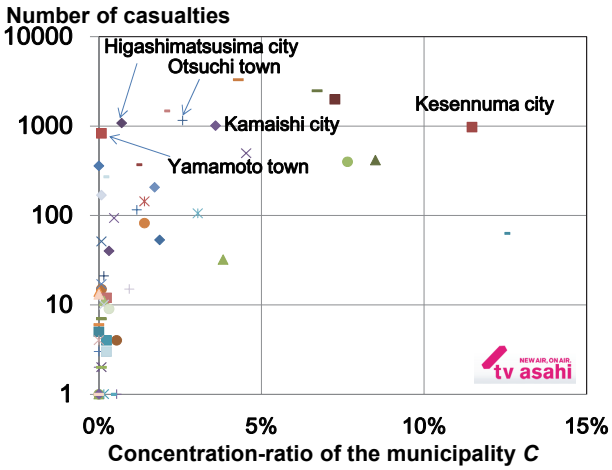
(b) NTV



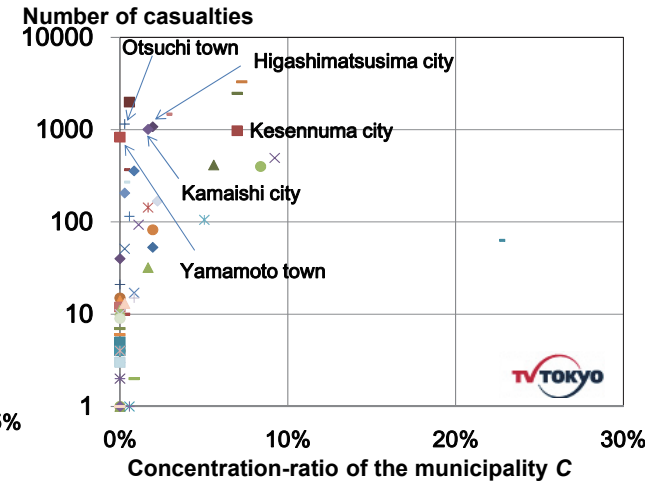
(c) TBS



(d) Fuji-TV

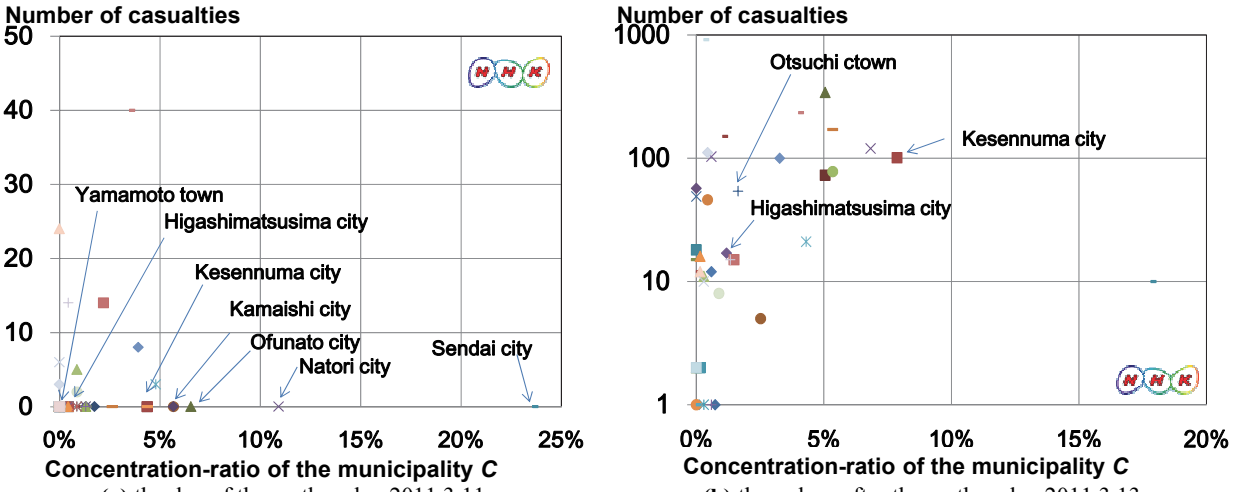


(e) TV-Asahi



(f) TV-Tokyo

Figure 3. Relationship between the number of casualties and the concentration–ratio of the municipality



(a) the day of the earthquake, 2011.3.11 **(b)** three days after the earthquake, 2011.3.13

Figure 4. Relationship between the number of casualties and the concentration–ratio of the municipality of NHK

At the time of disasters with extensive damage as seen in the 2011 off the Pacific coast of Tohoku earthquake, it is difficult to evaluate the whole scope of the damage and consequently there was an unbalanced TV news coverage. As a result, there were some municipalities that received more support than others as discussed in this paper. From this study it can be said that the TV news coverage made a big impact on the disaster response both for those who support and are supported thus it is important to consider the above-mentioned strategy for improvement.

Regarding to the role of news organizations, the TV stations are expected to provide useful information in order to contribute to the realization of appropriate disaster response, both from inside and outside of the disaster-affected area (Cabinet Office 2008) and it is important to consider the above-mentioned strategy for improvement from this point of view as well.

For the next activities of this study, we will make similar analysis using the amount of reporting time and verify the difference from the text data. Moreover, we will make further study to find out what kinds of subject matters were reported intensively.

AKCNOWLEDGEMENT

This research is supported by Mr. Takatoshi Ishii of JCC Corporation.

REFERENCES

Nomura Research Institute, Ltd.(2011). Research on trends in media contact associated with the earthquake, http://www.nri.co.jp/news/2011/110329.html. accessed at 2011.3.29.

My Voice Communications, Inc. (2011). Questionnaire survey on "How to gather information about the 2011 Off the Pacific Coast of Tohoku Earthquake ", http://www.myvoice.co.jp/biz/surveys/15417/index. ht ml. accessed at 2011.5.30.

Tanaka H., and Yoshii A., (2008). Introduction to Disaster Information Theory, Koubundou, pp.164-165, 218-227.

Ministry of Internal Affairs and Communications (2011). The request for Japan Broadcasting Corporation and National Association of Commercial Broadcasters in Japan about the information providing of the 2011 Off the Pacific Coast of Tohoku Earthquake, http://www.soumu.go.jp/menu_news/s-news /01ryutsu07_01000018. html. accessed at 2011.4.1.

Nakamori H., (1995). Problems about initial and regional-detail information forcused on the city of Hanshin region, *Journal of the Institute of Social Safety Science* **(5)**, pp.21-28.

Nakamori H., (2011). Problems of news and mass media in the 2011 Off the Pacific Coast of Tohoku Earthquake. *Journal of Urban problems*, **Vol.102**, pp.4-9.

NHK (2011). What kinds of contents did TV stations provide in the 2011 Off the Pacific Coast of Tohoku

Earthquake, NHK broadcasting studies, **Vol. 61, No.5**, pp.2-7.
NHK (2011). What kinds of contents did TV stations provide in the 2011 Off the Pacific Coast of Tohoku Earthquake (2), NHK broadcasting studies, **Vol. 61, No.6**, pp.2-9,
General incorporated association of Tokyo-sya (2011). Journalism of unprecedented disaster and tribulation. *Journal of general journalism research*, **No.217**, pp.9-18, 26-51
Kazuo Matsumura (1998). Reaction of society against the earthquake disaster reported by the newspaper, *Journal of Architectural Institute of Japan*. **511**, pp.61-67.
Cabinet Office (2008). Basic Disaster Management Plan, pp.48-49.