立命館地理学　第 30 号（2018）61-75

Geomorphological Environment for Inundation Attacks: A Comparative Research

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I. Introduction

There were various tactics to assault castles and forts in Medieval Japan, including frontal, fire, inundation, hole, starvation and surprise attacks. Usually multiple modes of attacks were combined. For inundation attacks, the army started with frontal attack, closing in on an enemy castle from all sides and then built an embankment around the castle and introduced water from the river to flood or isolate the castle.

There are four well-known inundation attacks in Japan: Bicchu Takamatsu Castle where Hideyoshi Toyotomi was involved, Owari Takegahana Castle, Musashi Oshi Castle and Kii Ohda Castle (Figure 1). The author has a different idea from common view that Kii Ohda Castle was attacked with 5 km-long embankment built around the castle located on the Holocene river terrace and therefore reviewed inundation attacks taking the geomorphological environment into consideration [1].

Hideyoshi Toyotomi effectively used inundation attacks in the process to unify the country. The author compares different inundation attacks selected through geomorphological considerations of them. The research started from making landform classification maps of the plains concerned based on the observation using 1/10,000 areal photos. Archives, old pictorial maps and old geomorphological maps were also surveyed. Geomorphology of inundation related remains were studied by observing ruins and geological formations at the excavation sites as much as possible and by reviewing the past excavation reports.

II. Inundation attack of Bicchu Takamatsu Castle

1. Chugoku-no-eki (war) and inundation attack of Takamatsu Castle

The attack against Takamatsu Castle [2] took place in May and June 1582 during the last period of Chugoku-no-eki. It is well known that Honnoji incident happened in the middle of the war, which made Hideyoshi Hashiba (later called Toyotomi) to sign a peace agreement with Terumoto Mohri and attacked Mitsuhide

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Key words: Takamatsu Castle, Takegahana Castle, Ohda Castle, Oshi Castle, Inundation Dike, Geomorphological Environment, Hideyoshi Toyotomi

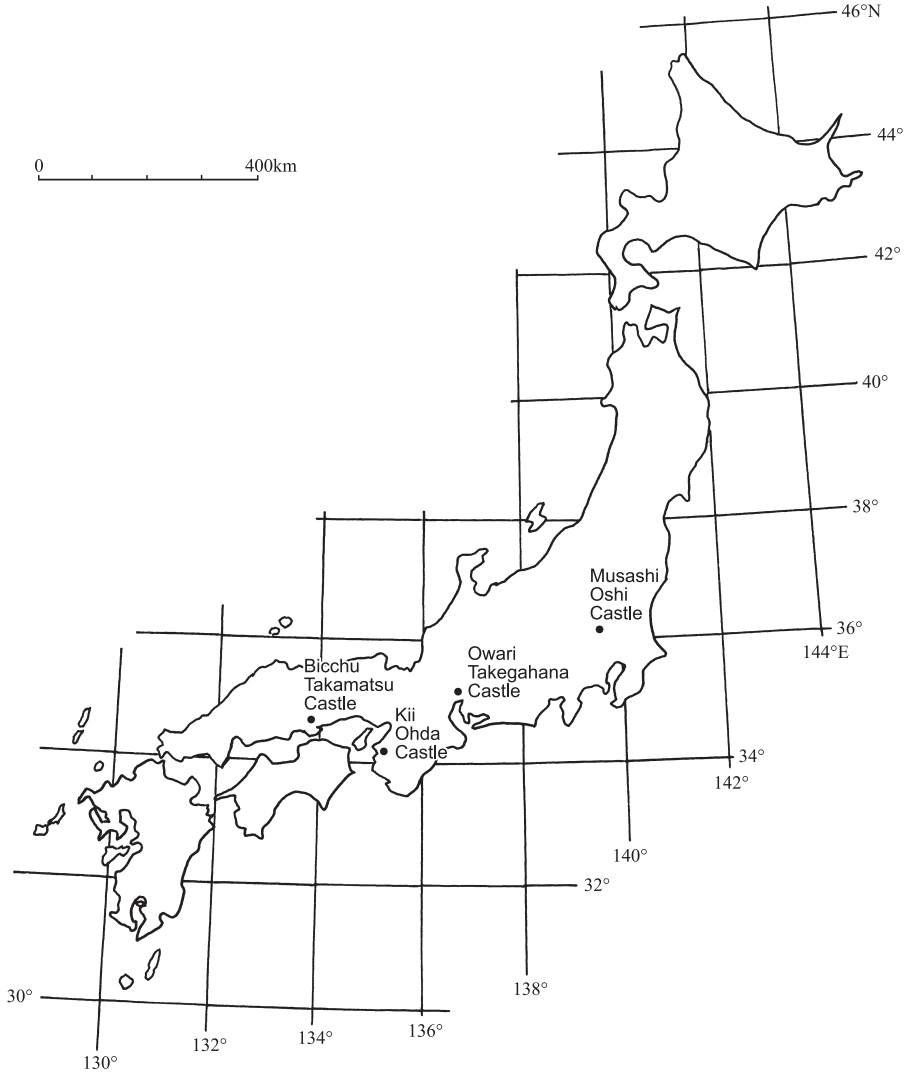

Figure 1 Index map showing area of investigation.

Akechi in the Yamazaki battle. There are, however, few geographical studies to elucidate the geomorphological environment of Takamatsu Castle and the process of the inundation attack.

2. Location of Takamatsu Castle and scale of the embankment built

Takamatsu Castle was an unattackable castle on the plain surrounded by marsh on three sides with large moat on the other side. The main enclosure of the castle remains as a 2 m high dirt mound where the grave of Muneharu Shimizu was built. Excavation of the site discovered roof tiles, proving it is the ruin of the castle. The territory of the castle was also identified. It is generally considered that 3 km long and 7.3 m high embankment for the attack

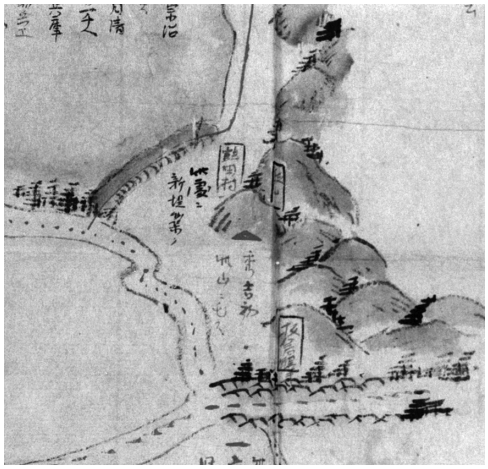

Figure 2 A map of Takamatsu Castle flood attack at Kaya County of the Province of Bicchu (part).

was built in 12 days. The embankment was said to have extended from Monzen village (near JR Ashimori Station) to Kawazugahana. Then water was introduced into the dike by damming up Ashimori River[3]. There still remain questions concerning the size of the embankment, the time required to build it and damming up of Ashimori River.

There are many illustrations depicting the inundation attack of Takamatsu Castle conserved to date. Many of the illustrations show the embankment running from Kawazugahana to Fukusaki. But Koshoken Furukawa, in the middle of Edo Era, drew the bank running from Kawazugahana to Matsuyama Highway (now Route 180) in his "map of Takamatsu Castle Inundation attack in Kaya County of the Province of Bicchu" (Figure 2) with the note "here built a new embankment". The note clearly indicates that the attack was performed with a small embankment. This illustration had been ignored from historical investigation for more than 200 years. But Koshoken Furukawa was reevaluated by Nukata and Hayashi[4] in recent years. Kagose[5] claimed that the embankment for flooding attack was as short as 300 m. The partial remains of the embankment are located in Kawazugahana and Fukusaki and excavation in 1998 confirmed the ruins of constructed dike and straw rice bags[6].

3. Geomorphological environment and inundation embankment of Takamatsu Castle

Takamatsu castle was located on the natural levee surrounded by plains of lowland with many old river channels (Figure 3). The old river channels were considered to be of Ashimori River, but majority of them is now assumed to be of Takahashi River due to its continuity and width. Takamatsu village along Matsuyama Highway was located on the natural levee formed by old Takahashi River. The village and Kawazugahana were only 300 m apart. To the northeast of Takamatsu Castle is the sub-divided land zones connecting to the gently sloping alluvial fan plains on the valley floor. Takamatsu Castle was built in the basin surrounded by the aforementioned terrains. The rain falling in the watershed of Ashimori River gathered there. On June 25, 1985, there was a heavy rainfall of 147 mm, which replicated the inundation attack though there was no collapses of the bank.

The soil should have been transported by 64,329 10-ton pick-up trucks if the embankment had been built as the archives described[7]. It was almost impossible to complete that scale of civil engineering work in 12 days even with the modern technology. It is also said to require 27.5 billion yen equivalent expenditure[8].

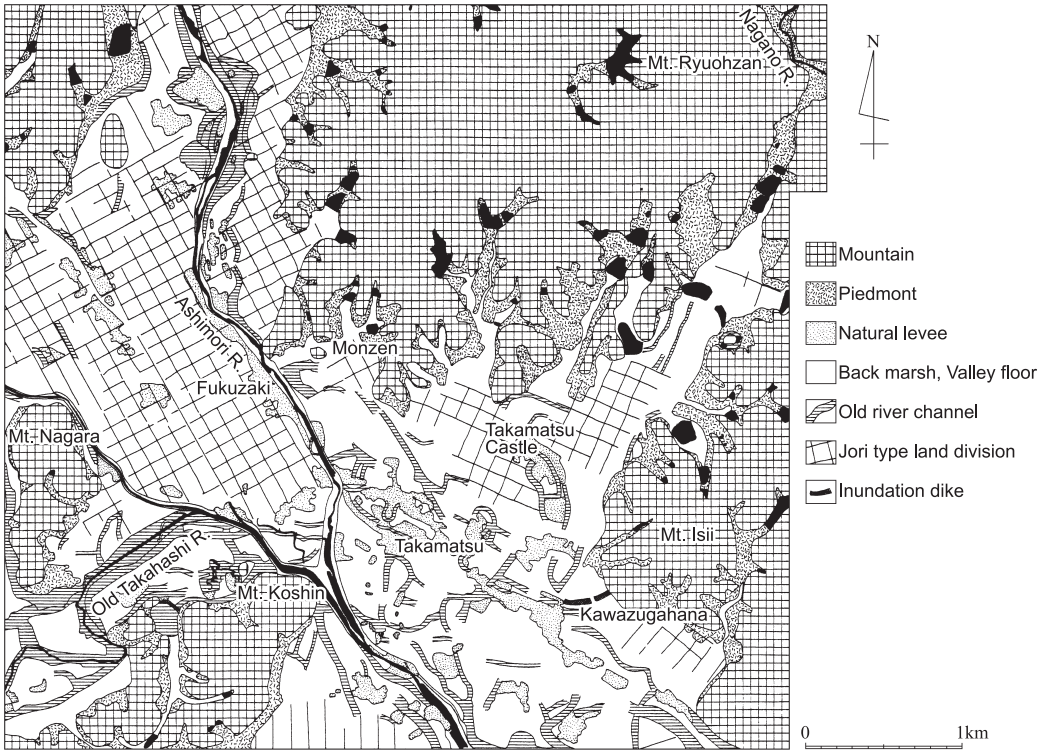

Figure 3 Geomorphological map around the Bicchu Takamatsu Castle.

Construction of dam in Ashimori River was considered to be one of the most difficult works. We can find remains of Fukusaki dike construction on the right bank of the river. Fukusaki Dike, however, is considered to be unrelated to inundation attack since there was no need to dam up Ashimori River in the tactics. They could have just draw water toward Takamatsu Castle by breaking the left bank of the river.

Hideyoshi is thought to have utilized natural fort with marsh and low wetland around the castle and have built the embankment using the natural terrain to operate inundation attack of Takamatsu Castle.

III. Inundation attack of Takegahana Castle

1. Komaki-Nagakute war and Takegahana Castle inundation attack

The war broke out around Komaki and Nagakute, Owari Province starting in March 1584. It was the battle between Hideyoshi Hashiba and the alliance of Nobukatsu Oda and Ieyasu Tokugawa. The frontline moved to the western part of Owari province in May the same year. Hideyoshi Hashiba brought his troops of 100,000 soldiers, crossing Kiso River to attack Takegahana Castle. The castle was managed and defended by Genroku Fuwa, the retainer of Nobukatsu Oda. Hideyoshi

Hashiba's war headquarter was located on Mt. Taiko. He saw sturdiness of the castle and built 3 km long embankment to operate an flooding attack[9]. Genroku Fuwa asked to make overtures for peace when he saw town houses and outer citadel inundated. He vacated the castle on June 10th and made a way of escape to Nagashima, the lord castle of Nobukatsu Oda. Hideyoshi Hashiba concluded peace with Nobukatsu Oda in November and with Ieyasu Tokugawa in December, when the war ended[10].

This chapter discusses Geomorphological Environment of Takegahana Castle and inundation embankment in Komaki Nagakute War as well as its location and size.

2. Geomorphological environment around Takegahana Castle and changes in the Kiso River channel

Nohbi plain is considered to be a typical alluvial plain with the alluvial fan, the natural levee and the delta area serially aligned from upstream to downstream of the river. Hashima City is located in the middle of Nohbi plain at the transition from the natural levee area to the delta area (Figure 4)[11]. There are old river channels of Sakai, Achika and Gyaku Rivers between Kiso and Nagara Rivers as well as

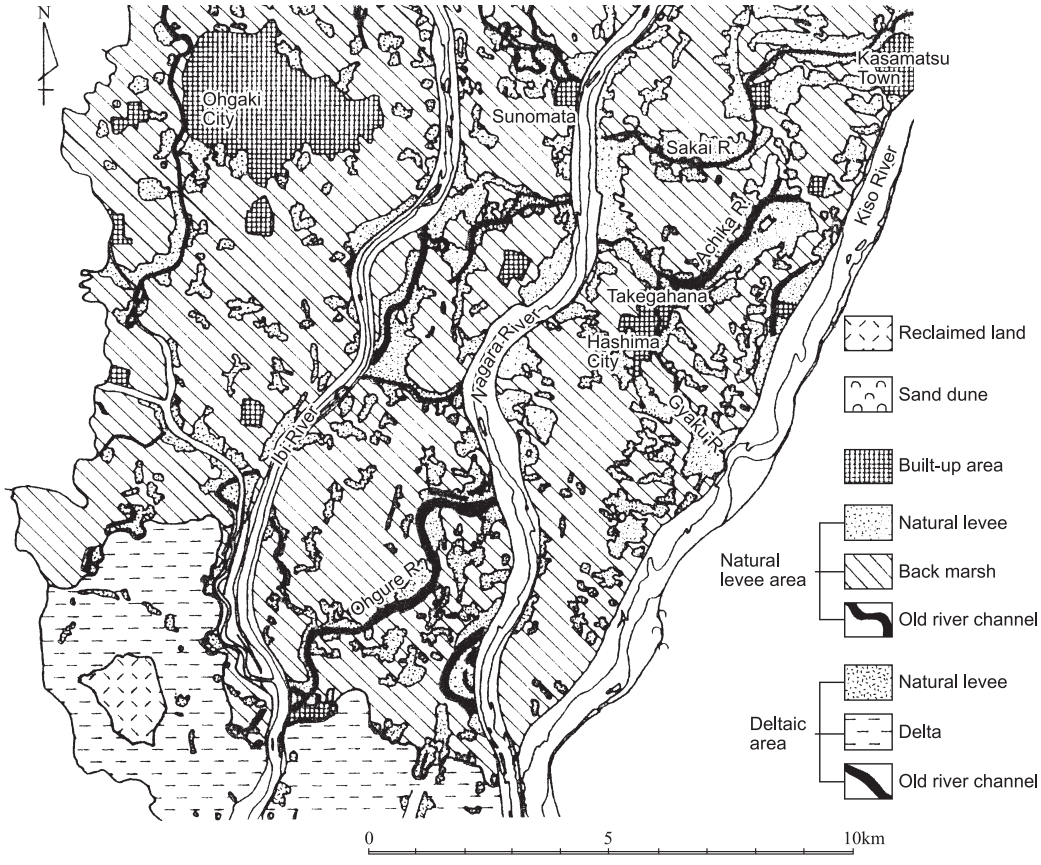

Figure 4 Geomorphological map around the Owari Takegahana Castle.

Nakamura and Ohgure Rivers between Nagara and Ibi Rivers. There are natural levees distributed along them. Natural levees are well developed along Sakai River on the right bank of Kiso River, whereas insular natural levees are distributed along Nagara and Ibi Rivers. The difference is attributable to the maximum flood volume and overwhelmingly abundant supply of earth and sand of Kiso River compared to those of Nagara and Ibi Rivers. Takegahana Castle was located at 6 m in altitude at the junction of natural levees and the lowland.

Sakai River was the main channel of Kiso River between 769 and 1586, branching into Achika River at Yanaizu and joining with Nagara River both at Sunomata and Moribe. Kiso River at the time of the inundation attack ran the channel of Sakai River at the border of Mino and Owari[12]. Takegahana Castle, therefore, was located on the left bank of Achika River in Haguri County of the province of Owari.

Two years later, the large flood on June 24, 1586 rerouted the flow channel of Kiso River (Sakai River) to the current channel running west from Maewatari, Kagamigahara City to Konobu, Ichinomiya City, Aichi Prefecture. Gyaku River and Kaganoi River (now on the channel of Kiso River) were branched at that time[13]. Hideyoshi Hashiba, with fear of Ieyasu Tokugawa at his lord castle in Okazaki, assumed to have Kiso River as the defense barrier and made Kiso River channel the border between Owari and Mino provinces incorporating three counties including Haguri County as a symbol of peace agreement of Nagakute War in 1586. The arrangement made Takegahana Castle on the right bank of Kiso River belong to the Province of Mino.

3. Location of Takegahana Castle and the size of Ichiya Zutsumi

It is not exactly known where Takegahana Castle was located since it was burnt down in the Battle of Sekigahara in 1600 and never rebuilt afterwards. There are two ideas on its site: i.e. Shiromachi[14] and Marunouchi[15]. The former is underpinned by some oral data. And the latter is based upon the old illustrated maps.

It is said that the inundation dike to attack Takegahana Castle was built overnight on May 10, which is thus called Ichiya Zutsumi. Ichiya Zutsumi is preserved in a good shape. There was a bank of Kuwabara Waju (polder) built on the west natural levee of Gyaku River. Ichiya Zutsumi was formed in a semi-circular shape joining to the bank on one end and to the Waju polder on the west bank of Gyaku River (Figure 5). Ichiya Zutsumi was said to be 2,646 m long and 10.9 m high[16].

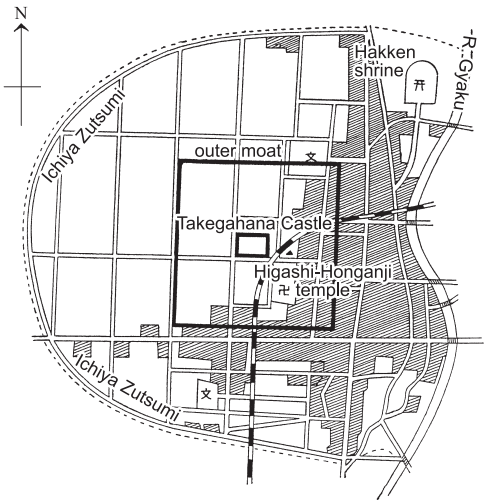

Figure 5 Map showing locations of Takegahana Castle and Ichiya Zutsumi.

4. Inundation attack of Takegahana Castle and Waju polder

Since Takegahana village was located along the natural levee of Gyaku River, the natural levee and the flow channel of Gyaku River were considered to have been there before Gyaku River became a branch of Kiso River after large natural flood in 1586. The author assumes that a small Takegahana Waju (polder) was built first followed by Kuwabara Waju as complex polder after 1586 because the former is smaller in height and width of the embankment than the latter. Floods became more aggressive after the completion of Okakoi embankment on the left bank of Kiso River in 1609. The Waju polder was not considered to have been large in scale before.

Why could Ichiya Zutsumi be built in such a short span of time? Why is it preserved well while embankments have almost disappeared in other areas? We can see that it makes one ring road when the remaining Ichiya Zutsumi is superimposed on the current geomorphological map. Superimposition of the embankment on the Cadastral Map of Takegahana Village of Haguri County (Figure 6, 1895) shows us that the road and Ichiya Zutsumi correspond to the border of Takegahana Village or the current border of Oaza. Ichiya Zutsumi was formed to enclose the settlement and farmland of Takehana village. The dike is considered identical to Takegahana Waju, an old Waju dike built to protect the village from flooding. Ichiya Zutsumi is nothing but the dike of Takegahana Waju (polder). Breaking Waju dike on the west bank of Achika River could introduce water into Takegahana Waju to inundate Takegahana Castle.

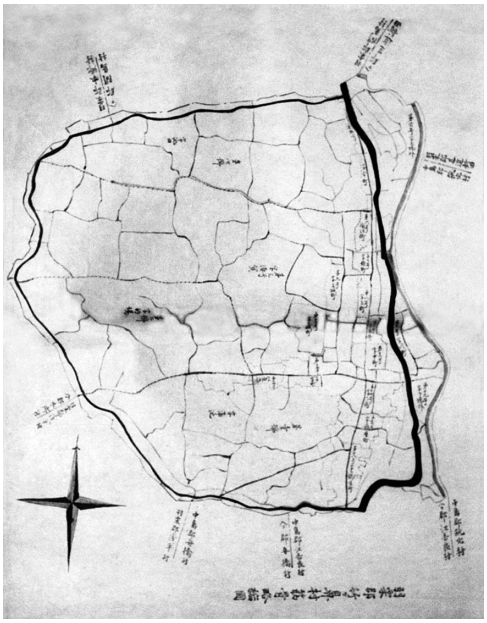

Figure 6 Cadastral map of Takegahana Village of Haguri County (1895).

It was necessary to build embankments for inundation attacks in other areas. There was no need to build a new embankment for an attack. They could only break the Waju dike for the war operation. Hideyoshi Hashiba was said to have subordinates who could read topography well. He developed the tactics to inundate Takegahana Castle utilizing natural fort of low wetland such as water lily paddies and wet paddies around the castle as well as the existing Waju dike.

IV. Inundation attack of Ohda Castle

1. Kishu attack and inundation attack of Ohda Castle

Inundation of Ohda Castle was operated as the last part of Hideyoshi Hashiba's attack of

Kishu in the end of March 1585. It is commonly thought that Ohda Castle was located around Raigo-ji Temple (Figure 7)[17]. Near the temple was the highest in altitude in the area, which makes it questionable if inundation attack could be in operation. Furthermore, it is almost impossible to complete the inundation embankment of 5 km in length and 13 m in height in 5 days. The author researched geomorphological environment of Ohda Castle to see if it was possible to operate the attack. It was found that the inundation attack of Ohda Castle was quite different from what was historically reported[18].

The letter of Hideyoshi Hashiba dated on March 27 described the attack, locking the survivors of Saika up into Ohda Castle[19]. The letter wrote that by tightly binding the branch-twined fence, any survivors could not escape from the castle and would die of hunger and thirst. It revealed that the original plan was not to use inundation but dehydration tactics. The letter of Hideyoshi dated on April 5, on the other hand, described how inundation attack was operated. We can see that they changed war tactics from dehydration to inundation after March 28 when they saw the terrain and found the castle vulnerable to inundation attacks[20]. It is considered that Ohda Castle was located in a geomorphological environment favorable for flooding tactics.

Water was introduced into the castle campus from Miyai River, an old flow channel of

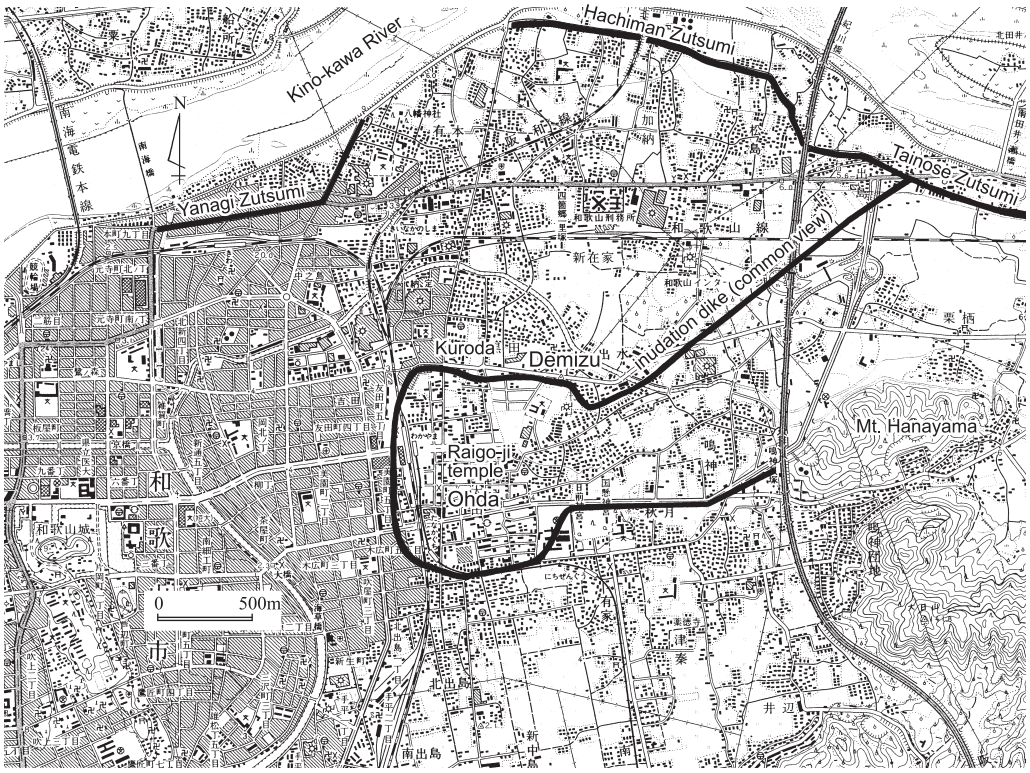

Figure 7 Map showing locations of Ohda Castle and inundation dike (common view).

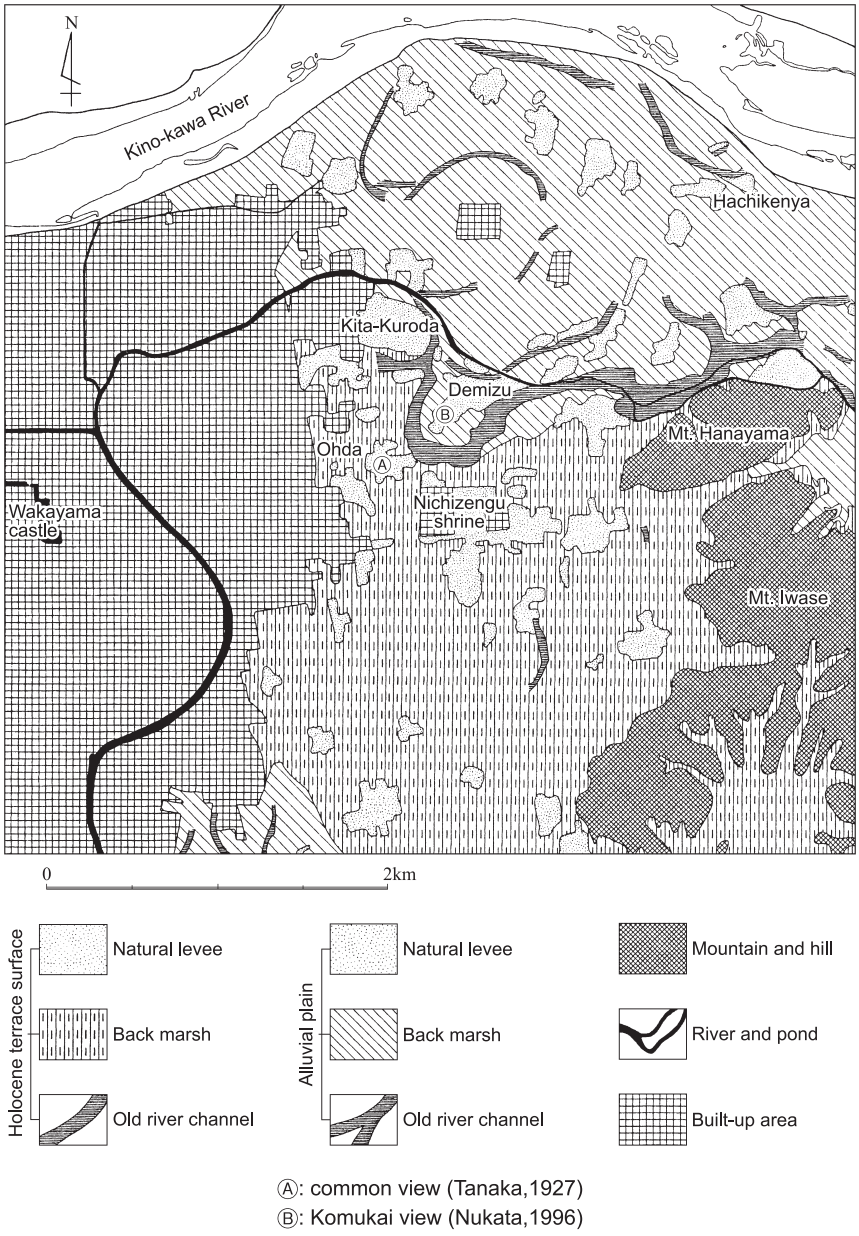

Figure 8 Geomorphological map around the Kii Ohda Castle.

Kinokawa River on April 1, and the moat was filled with water in a few days. The embankment collapsed as long as 300 m at Demizu Zutsumi, causing soldiers of Hideie Ukita's camp drowned. There was no record of drowning, however, on the side of people locked up in the castle[21].

2. Location of Ohda Castle and the scale of inundation dike

It is commonly believed that the 5 km long

embankment for the attack was built between Hakkenya to Hanayama via the west of current JR Wakayama station in 5 days[22]. It is true that inundation attack was performed but a lot is unknown with few contemporary materials on Ohda Castle and the inundation dike. The place considered to be the ruins of the dike is located where the natural levee and the terraced cliff are higher in altitude than the level of the alluvial plain. The scale of the dike differs in different historical documents, making information less reliable[23]. It seems that slightly higher land was retrospectively assigned as inundation embankment later.

3. Geomorphological environment and estimated location of Ohda Castle

Excavation was performed 75 times in Ohda/Kuroda districts without any clear remains and relics of the castle uncovered at the sites. Raigo-ji Temple is located on the natural levee at the Holocene terraced surface, which offers geomorphological environment unsuitable for inundation tactics (Figure 8). The extant flood dike was built for damming up Miyai River at the lowest point. There is no other evidence available now[24].

It is assumed that the Holocene terrace cliff and the natural levee (point bar) were utilized for flooding attack of Ohda Castle but the scale of the dike seemed to be small as it dammed Miyai River with Demizu flood dike. It is postulated that Ohda Castle was located near Komukai at Koaza of Ohda on the right bank of Miyai River[25].

V. Inundation attack of Oshi Castle

1. War at Odawara and inundation attack of Oshi Castle

Hideyoshi Toyotomi defeated Gohojo clan, the biggest warlord in Kanto, in the war at Odawara in 1590. Ujimasa and Ujinao Hojo, father and son, were besieged in Odawara Castle (Odawara City, Kanagawa Prefecture) and Hideyoshi Toyotomi surrounded the castle while attacking and capturing castles of Hojo's possession in Kanto area. Oshi Castle was the target of Hideyoshi's inundation attack in the middle of the war. Most of the castles of Hojo were opened without fighting or surrendered early, while Oshi Castle continued its resistance until Odawara Castle was opened.

2. Geomorphological environment of Oshi Castle

Oshi castle was on the plains located in the alluvial lowland between Arakawa and Tone Rivers. There is the old water channel called Motoarakawa on the left bank of Arakawa River (the main water channel at the time of the attack) with small tortuous channels and natural levees developed on both side of the river (Figure 9). Hoshi River and Oshi River running around Oshi Castle are considered to be the old water channels of Arakawa River.

Musashi Oshi Castle map (1823) illustrates the main building and other structures located on the natural levee distributed in the form of island and surrounded by lowland. Oshi Castle was an unimpregnable fort and castle effectively utilizing the terrain of the area. The castle had a nickname of Floating Castle. Ujinaga Narita, the lord of the castle, closed in at Odawara with

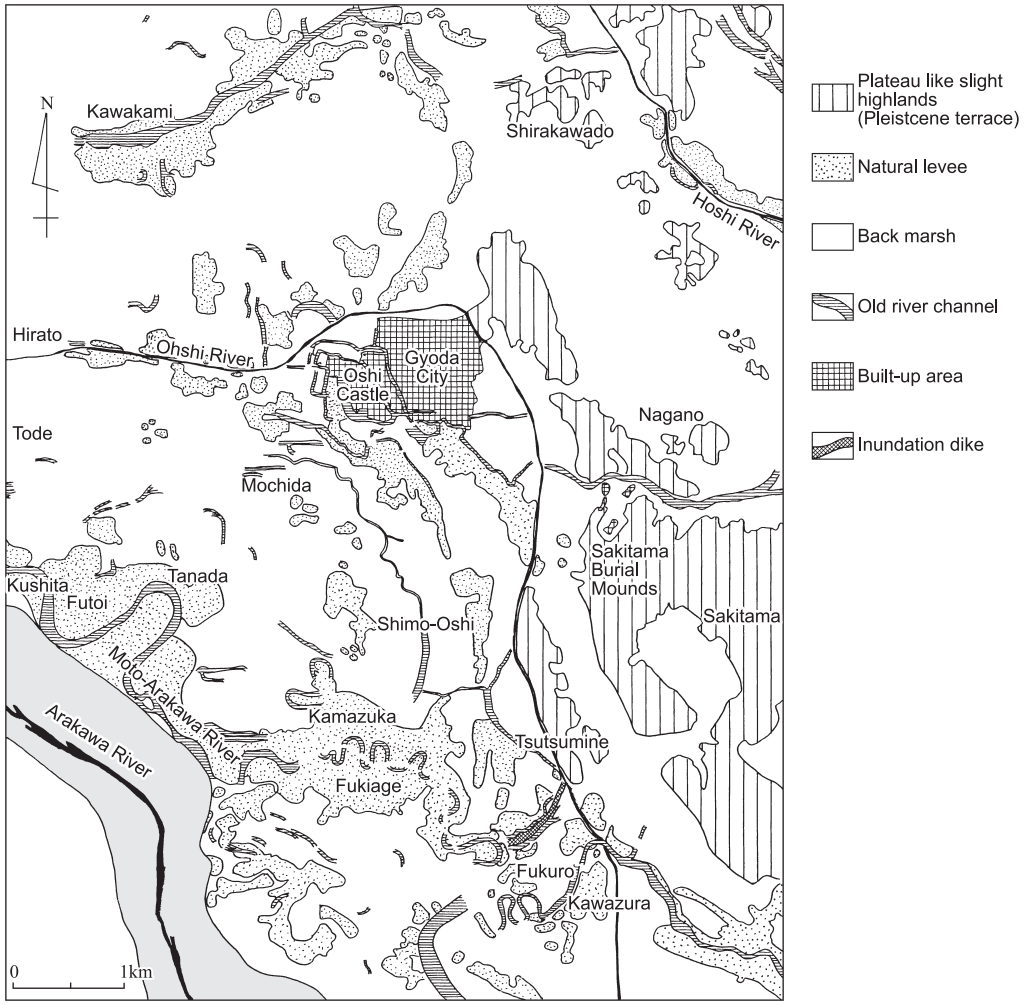

Figure 9 Geomorphological map around the Musashi Oshi Castle.

Gohojo and Oshi Castle was defended by 3,500 subordinates of his including Yasusue and Nagachika Narita [26].

To the east of the castle was a group of Sakitama Burial Mounds including Maruhaka-yama mound where Mitsunari Ishida placed his war headquarter. The burial mounds are located on a plateau like slight highlands. It is of slight elevation as high as the natural levee created by subsidence of the river terrace equivalent to Musashino terrace in the greater subsidence of Kanto Plain around Kazo lowland [27].

3. Inundation attack of Oshi Castle and the scale of Isida Zutsumi

The large troops of 23,000 including Mitsunari Ishida successfully made Tatebayashi Castle to surrender on June 4, advancing across Tone River to enclose Oshi Castle. Since Oshi Castle was surrounded by low wetland, the troops continuously failed in their attacks.

Mitsunari Ishida who was at a loss how to continue fighting decided to use inundation tactics following the model of Hideyoshi Toyotomi. It is said that he started to build an embankment on June 7 and completed 14 km long and 5.4 m high structure in 5 to 7 days[28]. The embankment was said to run south west from Sirakawado of Gyoda City on the right bank of Tone River to Fukuro and Iitsuka of Konosu City and Ohi, Tode, Hirato and Kumagaya of Kumagaya City on the left bank of Motoarakawa River via Nagano, Sakitama and Tsutsumine[29]. The inundation embankment was called Ishida Zutsumi since Mitsunari Ishida built it (Figure 10).

The area from Nagano to Tsutsumine of Gyoda City where Ishida Zutsumi runs is on slightly elevated tableland with Sakitama Burial Mounds. There seemed to be no need to build embankment around there. Since the natural levee of Motoarakawa River was high enough extending 8 km between Kumagaya City and Shimo'oshi of Konosu City, the geomorphological environment around there required no dike to be built for inundation attack. Areal photos, however, reveal remains of the embankment between Tsutsumine of Gyoda City and Fukuro of Konosu City, which extends only 800 m. The truth is that Mitsunari Ishida utilized natural levees and slight elevations without making

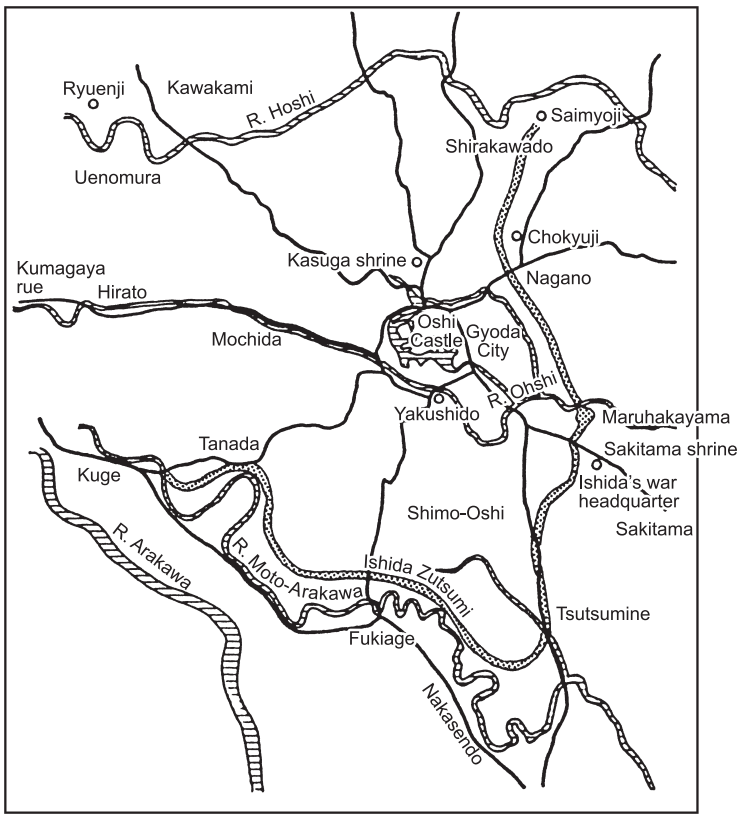

Figure 10 Map showing locations of Oshi Castle and Ishida Zutsumi.

full-scale construction of the dike. The embankment seemed to be built only between Tsutsumine and Fukuro where altitude was the lowest.

Inundation operation started on June 11 when water was introduced from Tone River and Arakawa River. Water from Tone River was drawn at Ehara, Fukaya City to the area around Oshi Castle through the channel of Hoshi River. It was documented that the area was inundated on June 16[30]. Strong storm increased water depth on June 18, and the embankment could not resist water pressure at Tsutsumine and Fukuro, the lowest points of the embankment. The bank thus collapsed at the point where Horikiri Bridge crosses the river now. The collapse caused drowning of 270 soldiers of Ishida troop stationing around Kawazura of Konosu City, leading to the failure of the inundation attack[31]. There is no record of drowning among those besieged in Oshi Castle.

Ujinaga Narita in Odawara Castle surrendered to Hideyoshi Toyotomi on June 20 without successive opening of Oshi Castle. Hideyoshi Toyotomi dispatched supporting troops led by Nagamasa Asano and Masayuki Sanada to Oshi Castle without success. Hideyoshi commanded Kagekatsu Uesugi and Toshiie Maeda to take the field on July 6. It was also said that Hideyoshi Toyotomi himself would visit Ishida Zutsumi on July 14 and 15[32].

The soldiers besieged in Oshi Castle endured for more than a month but Ujinaga Narita, the castle lord decided to open the castle for surrender, making unification of Japan by Hideyoshi Toyotomi almost completed.

Most parts of Ishida Zutsumi were located along the old flow channel of Motoarakawa River and on the slightly elevated tableland. The embankment was built between Tsutsumine of Gyoda City and Fukuro of Fukiage Town where the distance between the two was the smallest. The built structure was 2 m in height. The flow channel of Oshi River was located at the lowest plane and Mitsunari Ishida considered that damming the river at the point should inundate the hinter lowland between the natural levee and the slightly elevated tableland to execute the attack in vein.

VI. Conclusion

The author surveyed the remains of inundation embankments in four different areas and studied their geomorphological environments. It is found that building of 300 m and 800 m of embankments allowed inundation attack for Takamatsu Castle and Oshi Castle respectively, in addition to slight rising of the land in other areas. It is estimated that inundation attack of Takegahana Castle used Waju dike. There was no need to build any new embankments. Though it was commonly thought that 5 km long embankment was built for the inundation attack of Ohda Castle, the evidence is limited to only Demizu Zutsumi to dam Miyai River. It is reasonable to consider that Ohda Castle was located in the terrain requiring only some hundred meters of built embankment for flooding attack.

It is possible for us to learn about inundation operations at the four areas through archives and illustrated maps. They are of historical value but do not report facts and figures accu-

rately. It is the challenge and responsibility for researchers to conserve historical remains of inundation attacks and related archives and also to make detailed investigation of the operations with excavation results and of the illustrated maps. It is necessary to conduct geomorphological study as well. These efforts would lead us to differentiate illusions and facts of inundation attacks.

Flooding simulations were already performed for Takamatsu and Oshi Castles, proving that a small scale construction of embankment was enough for inundation tactics[33]. If it is proven that the inundation attack of Ohda Castle in the remains at Koaza where Raigo-ji Temple is located is not possible even with 5 km long embankment, the probability that the castle was built at Koaza "Komukai" will be higher, which is the location of the castle assumed by the author.

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水攻めの地形環境―その比較地理学的研究―

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わが国における水攻めには、豊臣秀吉が関係した備中高松城、尾張竹ヶ鼻城、武蔵忍城、そして紀伊太田城の４つが知られている。筆者は、最初に紀伊太田城の水攻めについて、完新世段丘面上に位置する太田城の周囲約５km に堤を築いて水攻めにしたとする従来説に疑問をいだき、地形環境の観点から４つの地域の水攻めを踏査し地形環境を比較検討した。

その結果、嵩上げした程度の所を除くと、水攻堤は高松城では 300 m 余、忍城では約 800 m を築堤しただけで水攻めができたと考える。竹ヶ鼻城水攻めでは輪中堤を利用し、新たな築堤はまったく行わなかったと推定する。太田城水攻めでも従来説は５km 余のすべてを築堤としたが、宮井川を堰き止める部分の出水堤しか確認することができず、数百 m 程度の築堤だけで水攻めができた場所に太田城があったと考えることが妥当と思われる。

古文書や絵図によって伝えられる４つの地域の水攻めは、歴史的にそれなりの価値はあるが、事実とはかなりかけ離れていることがわかってきた。水攻めの史跡及び関連資料を保存すると共に、発掘調査の成果、絵図や地形環境等から各地の水攻めをさらに詳細に検討し、水攻めの虚像と実像を明らかにしていくことが今後の課題と考えている。

キーワード：高松城、竹鼻城、太田城、忍城、水攻堤、地形環境、豊臣秀吉

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