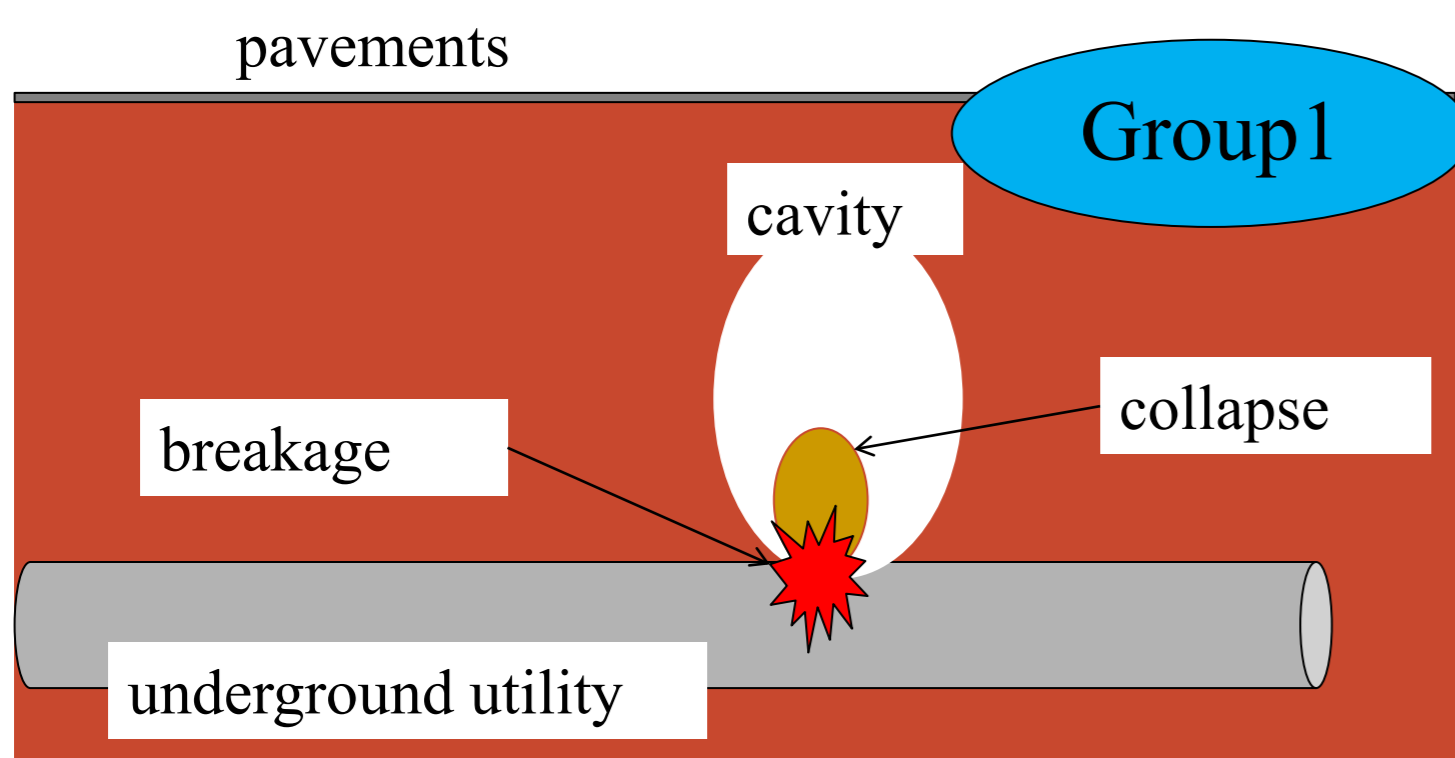


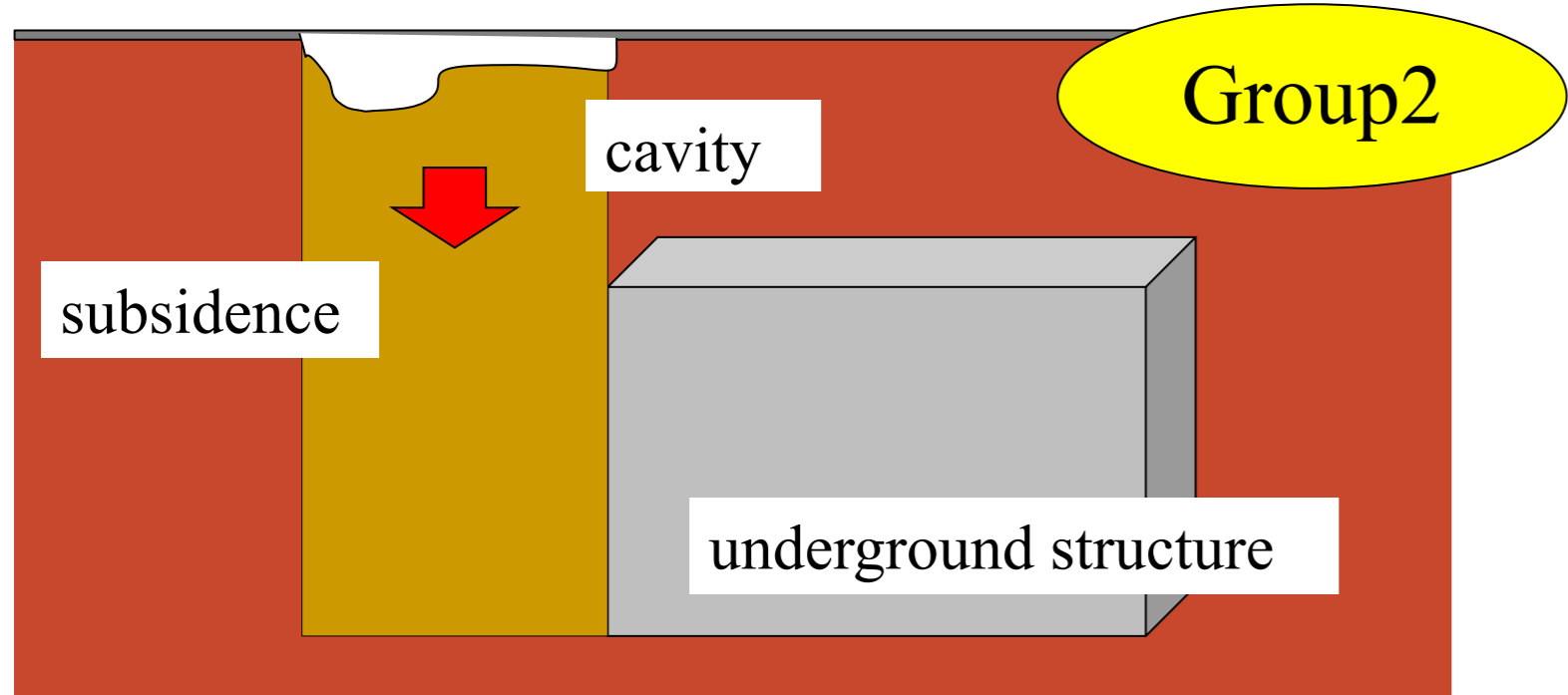
Road cave-in accidents occur frequently in many parts of the world in recent years. Some advanced initiative including improved sub-surface cavity survey technology and newly developed repair material reduced the number of cave-ins. Research of cavity mechanism has been conducted continually for prevention of road cave-ins in Japan. The purpose of development of the subsurface cavity potential map is to understand the regional characteristics and especially vulnerable zone about cavity occurrence ratio. The further value of the maps firstly is to get important information for preparation against disaster such as earthquake, heavy rain which cause cavities. And it makes available to compare the characteristics of cavity with another region. In this study, data of subsurface cavities obtained in Fukuoka city were examined with some geographic factors using GIS. Target cavities were divided into two groups based on the cause of cavity generation. A prototype of cavity potential map was proposed.

道路陥没は毎年日本でも数多く発生していますが、最近は特に道路下空間に対する危機意識が高まっています。道路陥没予防には、その前段階の路面下に発生する空洞に適切な対策を施す必要があります。路面下空洞調査は様々な自治体で行われていますが、どのような箇所に空洞が出来やすくどのような空洞がより危険なのか等を分析し調査に活かしている例は少ないのが現状です。本研究では、福岡市の空洞の生成傾向と空洞発生箇所の地理的特徴との相関を分析しました。空洞発生メカニズムに基づいて空洞を2種類に分類し、場所の特徴から空洞の発生しやすさを評価した結果をGIS上で整理し、福岡市の空洞ポテンシャルマップの作成を試みました。

### 主な空洞生成メカニズム Mechanism of Cavity Occurrence



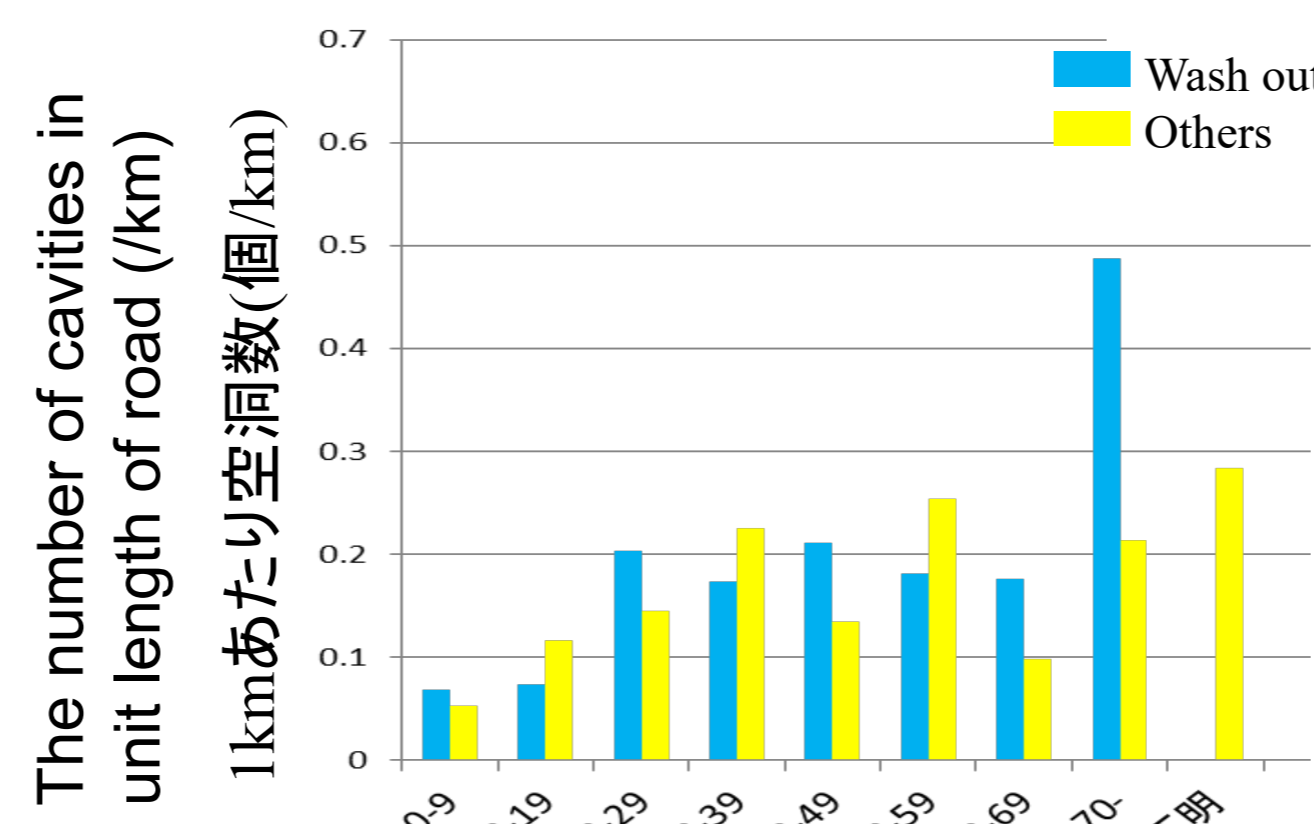
埋設物の破損等による土砂が流出や吸出しする現象  
Washing out of soils from the breakage of underground utilities.



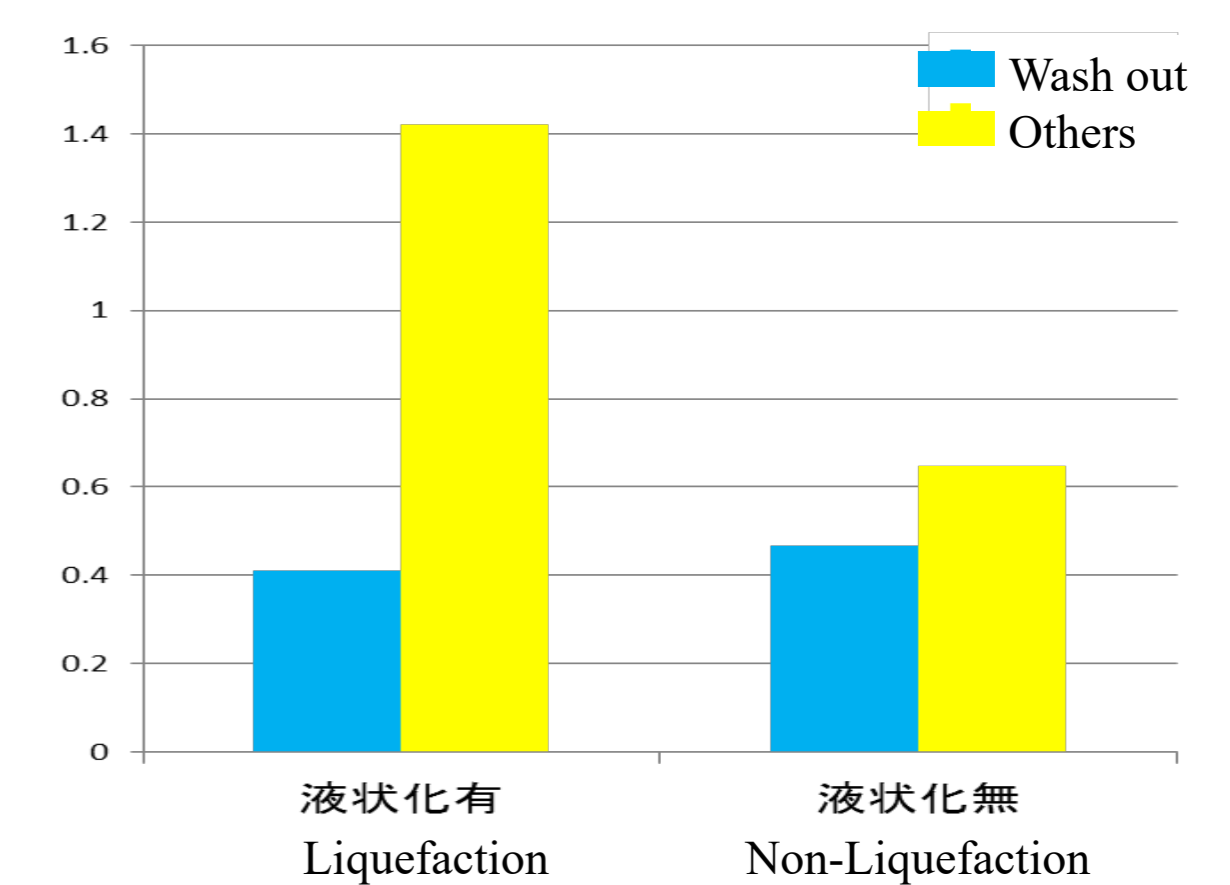
吸出し以外の現象、地下構造物の周辺地盤が沈下など  
Subsidence around underground structure by the fluctuations of groundwater level.

### 空洞箇所の地域特性分析 Analysis of Characteristics of Location Relevant Factors of

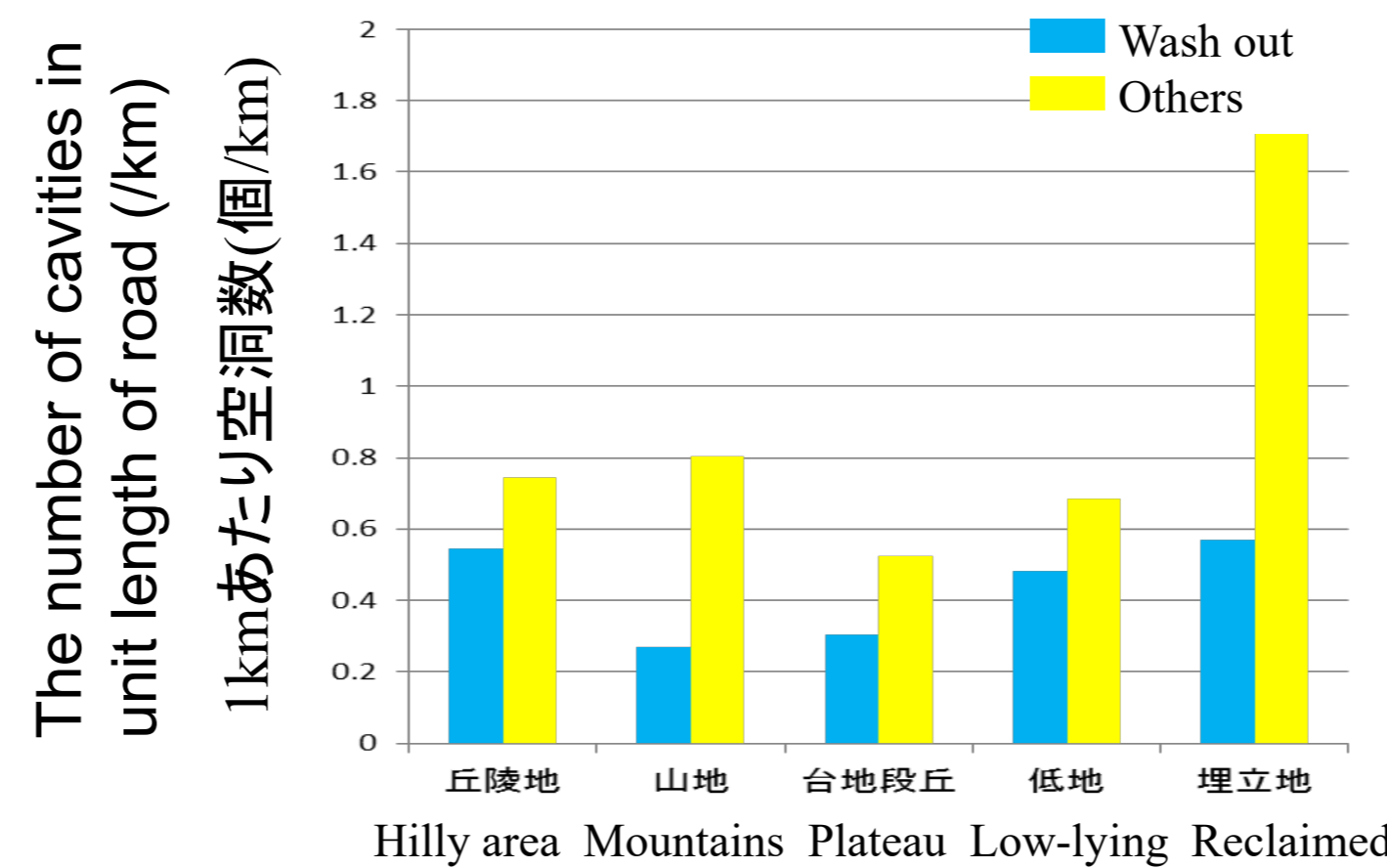
下水供用年と空洞頻度  
The age of sewage and occurrence ratio of cavity



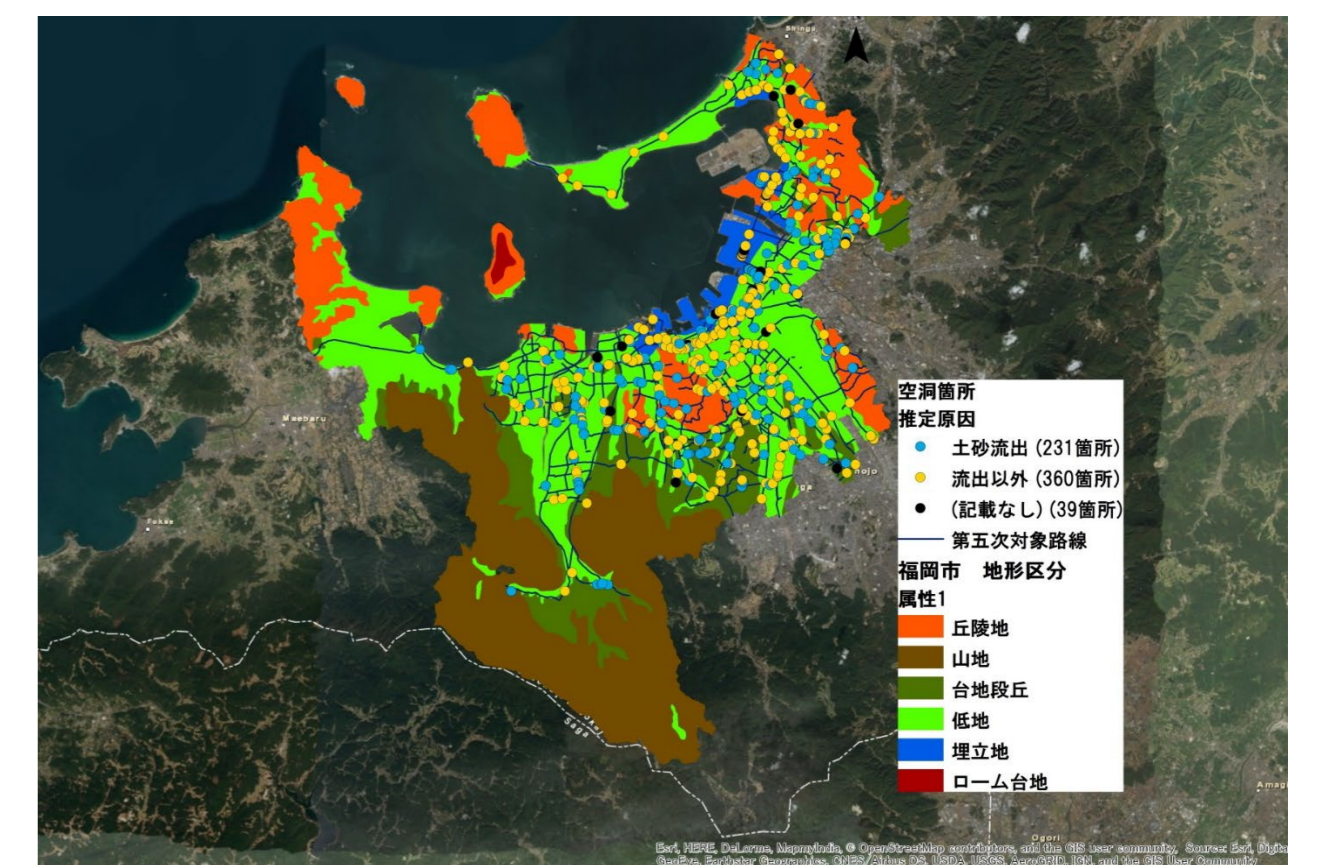
液状化被災履歴と空洞頻度  
The experience of liquefaction and occurrence ratio of cavity



地形区分と空洞頻度  
The ground form and occurrence ratio of cavity

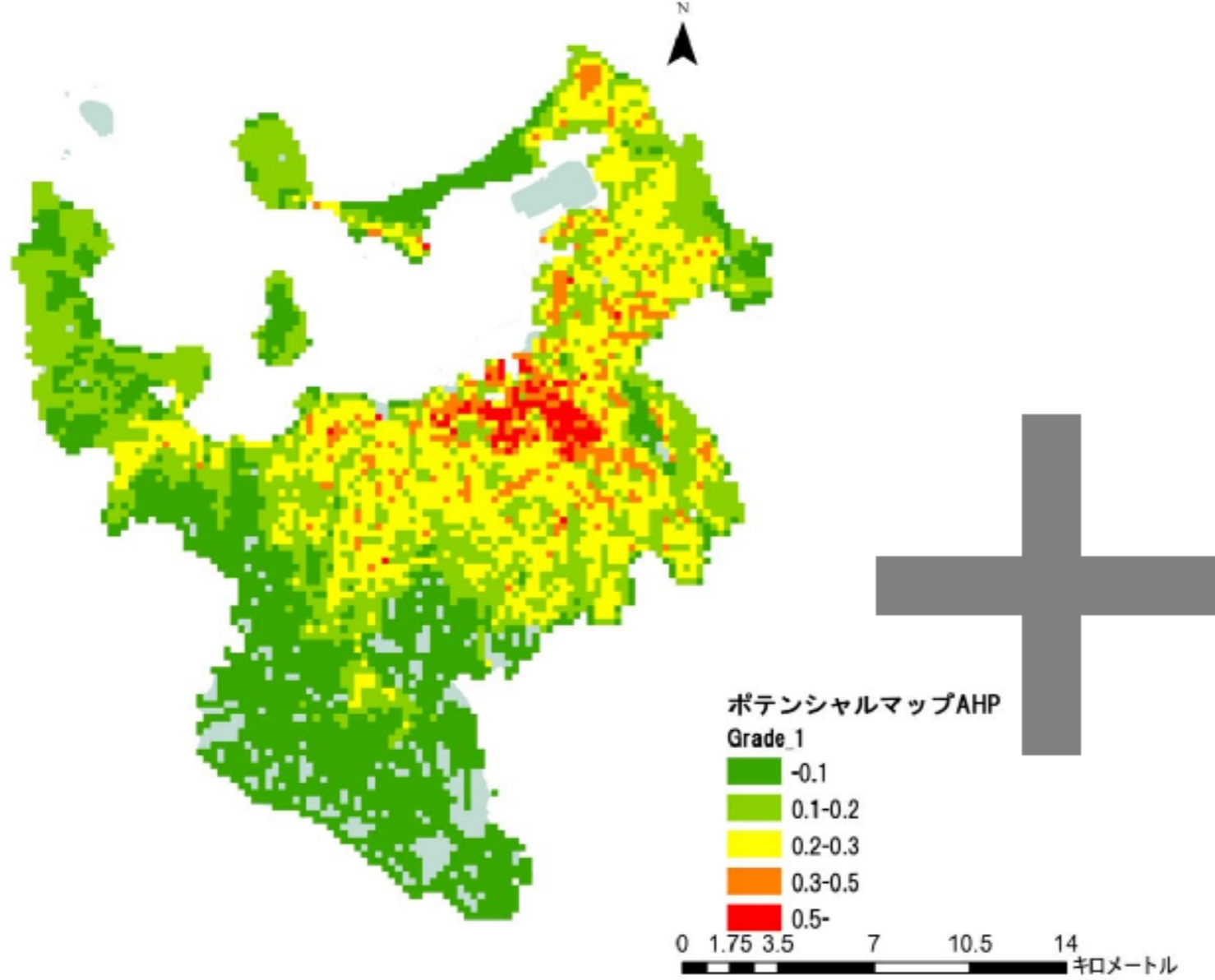


地形区分と空洞発生分布  
The ground form and location of cavities

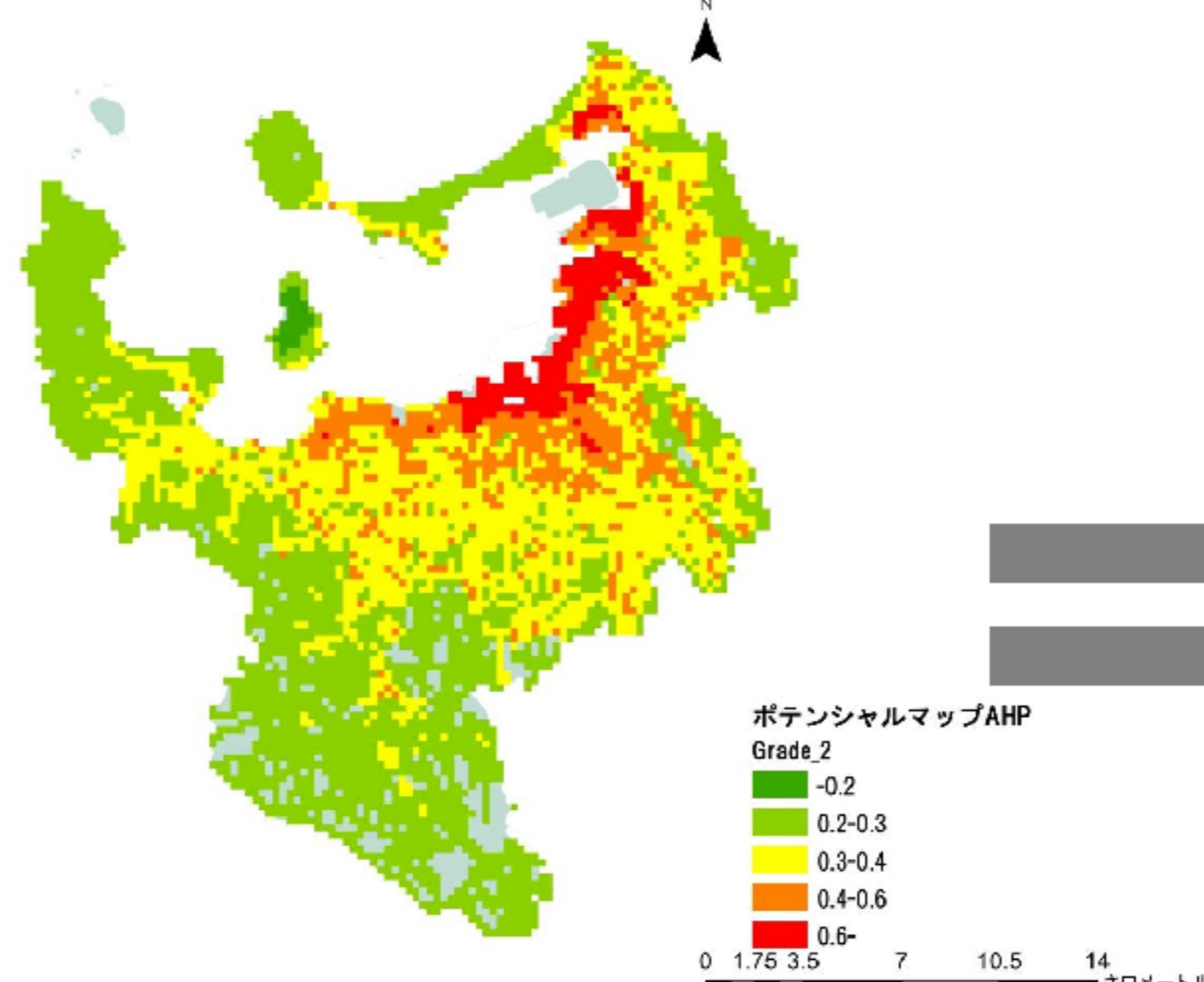


### 空洞ポテンシャルマップの試作 Prototype of cavity potential map

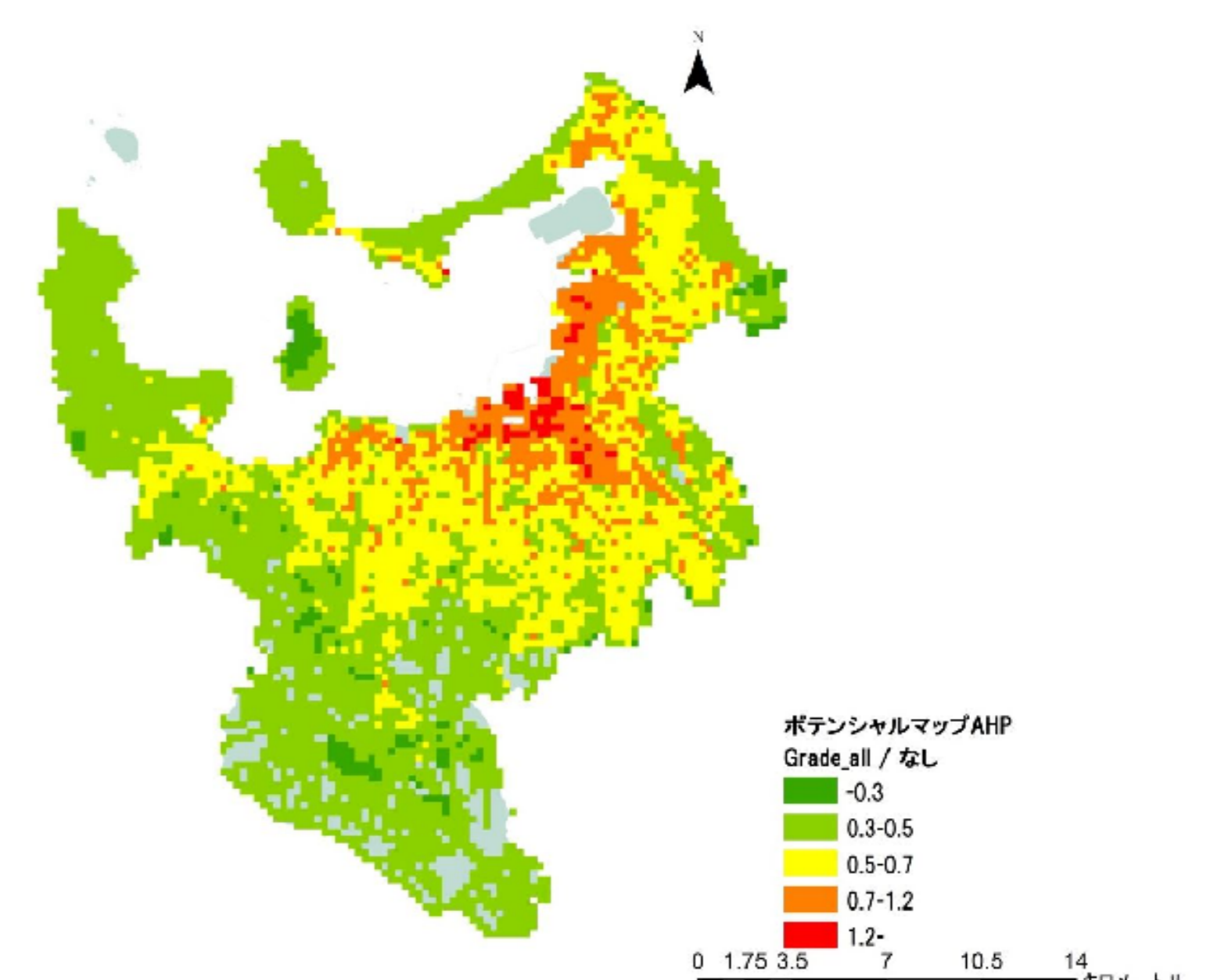
Cavity potential Map due to washout  
The Central zone has high-potential.



Cavity potential Map due to not washout  
Northern reclaimed area has high-potential.



Cavity potential Map of FUKUOKA city



空洞と発生場所の相関の強さを考慮し、素因ごとに点数をつけ、福岡市を250m四方のグリッドに分割し、地理的特徴からグリッドごとに点数を求め、空洞発生メカニズム別に空洞ポテンシャルマップを試作しました。

Considering the correlation between cavities and their factors, the cavity potential map based on the features in each place was created.

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