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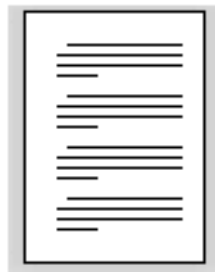
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**Preliminary Assessment of Seawater Intrusion in Phuket Island,
Thailand**

Sakanann VANN

**A Thesis Submitted in Fulfillment of the Requirements for the
Degree of Master of Science in Earth System Science**

Prince of Songkla University

2018

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I hereby certify that this work has not been accepted in substance for any degree, and is not being currently submitted in candidature for any degree.

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ABSTRACT

Seawater intrusion can gradually cause a severe problem by contaminating freshwater aquifers and causing a lack of fresh water.

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First of all, I must express my very profound gratitude to my family for providing me with unfailing support and continuous encouragement throughout my years of study.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

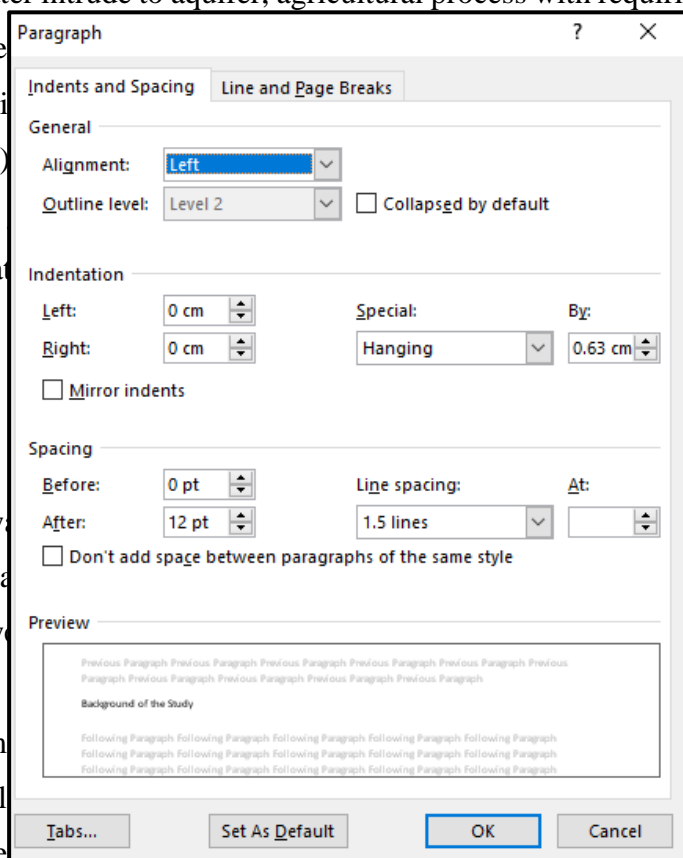
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There are some main factors causing seawater intrusion, the movement of saline water into underground freshwater aquifers, along coastal areas such as rising of seawater level caused by global warming, high consumption of freshwater that can cause the shortage of freshwater, over-pumping from aquifer that can reduce water pressure and then let the seawater intrude to aquifer, agricultural process with requiring lots of amount of fresh water knowledge as well. The salinity (resistivity and self-potential) geophysical, geochemical, and between freshwater and seawater set up.

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1.2 Statement of Problem

While the seawater intrusion is a global problem, it is also a local problem in Thailand. Phuket island is a well-known tourist destination with 10 million visitors in 2013 and 12 million in 2014 (unpublished tourist data from Phuket Tourism Authority). The rapid increases in population and increased water demands in the island have led to over-exploitation of groundwater and 32% surface water (DGR, 2015). Overuse of groundwater near the coast contributes to intrusion by seawater. Consequently, the groundwater close to the coast shows a relatively high salinity. Seawater intrusion is globally a common problem in the coastal areas by the sea. It is normally caused by prolonged changes in coastal groundwater levels, and seawater intrusion is the main cause of high groundwater



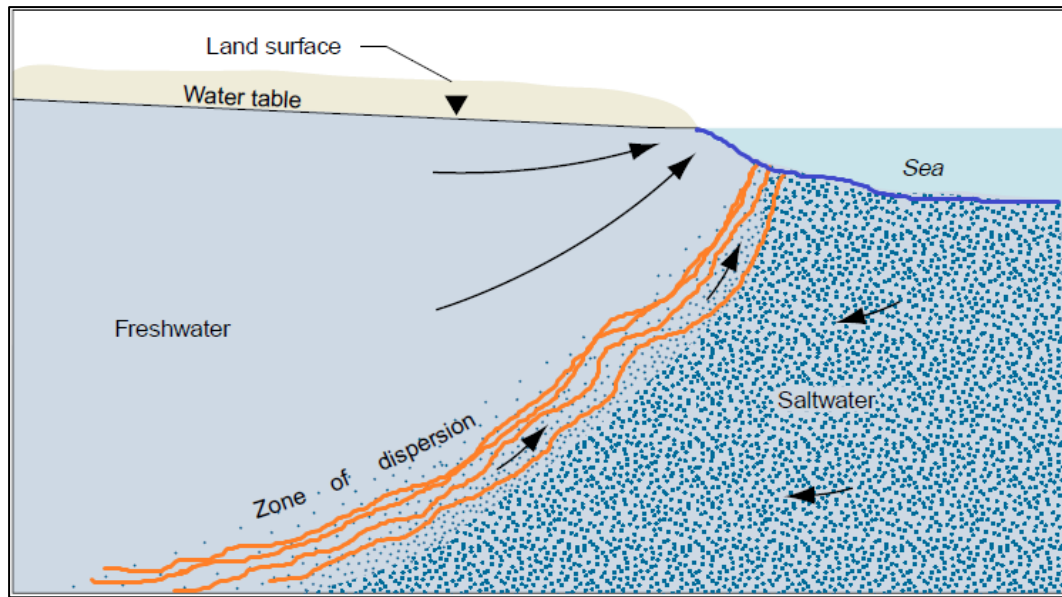


Figure 1.1 Flow Patterns of Groundwater and the Dispersion Zone in Coastal Aquifer.
(USGS, 2000)

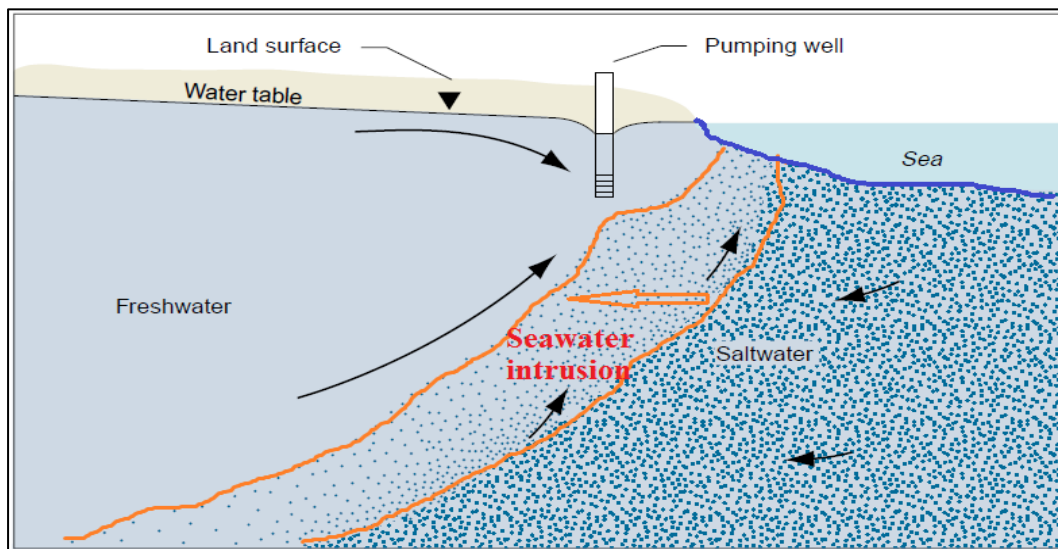
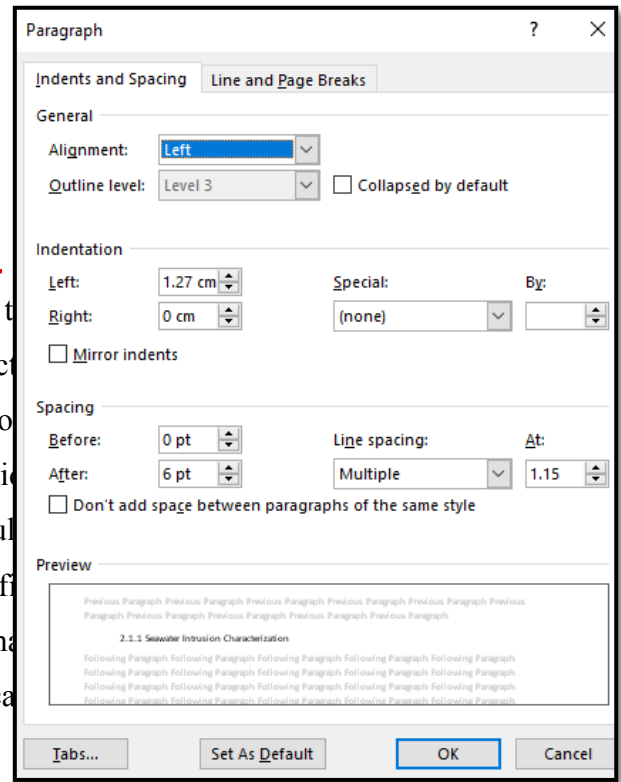


Figure 1.2 Flow Patterns of Groundwater

1.2.1 Seawater Intrusion Characterization

The consequences are then applied to the intrusion dynamics, which are able to assist in effecting the long lasting impacts of rising of sea-level on coastal (1999) have, furthermore, specifically clarified the contamination in an unconfined aquifer and the resulting table and zone of dispersion. In addition, it is identified that was deposited during the Tsunami can affect marine increasing the magnitude of seawater intrusion, it causes pollution problems.



1.2.1.1 Groundwater Quality and Pollution

Seawater composition around the world remains stationary; otherwise, the fresh groundwater composition in aquifers probably seasonally change.

Table 1.1 Number of Groundwater Wells and Amount of Allowed Water Consumption in Phuket in 2012. (ISET *et al.*, 2013)

Activities	Number of wells	Amount of allowed water consumption(m ³ /day)
Agriculture	6	325
Business	567	34,881
Business service	14	470
Industrie	2	220
Local	282	2,881

Table 1.2 Soil Sample Preparation

Soil Sample	Seawater	Distill water
1	100%	0%
2	75%	25%
3	50%	50%
4	40%	60%
5	20%	80%