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Forest Science

# Study on water infiltration characteristics in Gotjawal (forest on lava area) wetland area

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## 1. Introduction

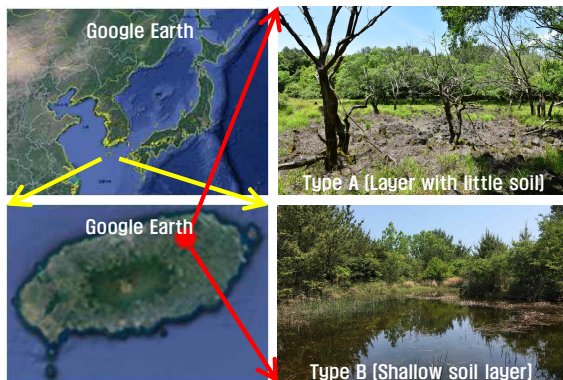
### Gotjawal (Forest on Lava area)

- Gotjawal was formed by the lava flow along the slopes as a result of the volcanic activity of the oreums which are distributed all over Jeju Island, the Republic of Korea. Gotjawal areas are formed as very young lava in less than 10,000 years, including a rough surface (Aa lava) and smooth terrain (Pahoehoe lava), depending on viscosity and velocity of lava flows.
- Aa is a type of lava rock with high viscosity and sharp and jagged surface and Pahoehoe is a type of lava rock with low viscosity and smooth and ropy surface.
- Wetlands in Gotjawal are created with "Pahoehoe lava" and very important in terms of water storage.

### Objectives

- Analysis of Hydrographs in two different wetlands.
- Identification of Initial rainfall with respect to antecedent non-rainfall days.

### Site Description



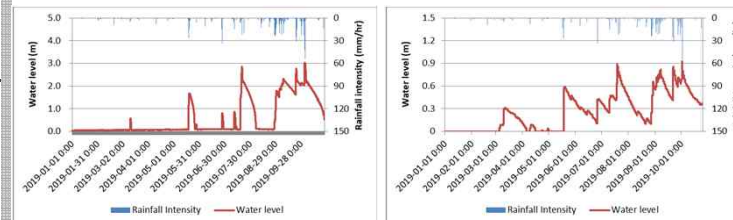
- Annual average temperature and precipitation is 13.6°C and 2,379.7mm. Area in type A and B is 1,180m<sup>2</sup> and 452m<sup>2</sup>
- Water level measurements and initial water level response time analysis

## 2. Rainfalls and Hydrographs

### Rainfalls events

Event Date	Total rainfall (mm)	Duration (hr)
18-May	293	48
26-June	125	24
17-July	134	62
27-August	211.5	59
2-September	104.5	25
22-September	445	43
1-October	258	32

### Hydrographs in two different areas



Type A (Layer with little soil)

Type B (Shallow soil layer)

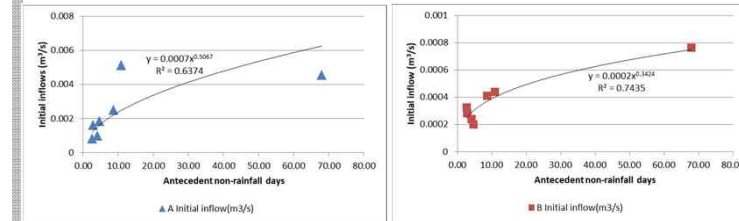
- Type A : The maximum water level was 3.03m. Water level was sensitive to rainfall. Except heavy rainfall, all rainfall were infiltrated into the bottom of the wetland.
- Type B : The maximum water level was 0.93m. Water level decreased very slowly. After May 2019, water level remained above 10cm.

## 3. Initial rainfalls

### Initial rainfalls

- The initial rainfalls depends on the thickness of the soil layer, which affects the amount of water resources in the wetland and as well as the diversity of plant species.

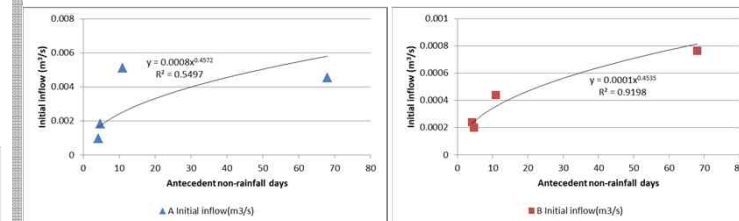
### Initial rainfalls with all events



Type A (Layer with little soil)

Type B (Shallow soil layer)

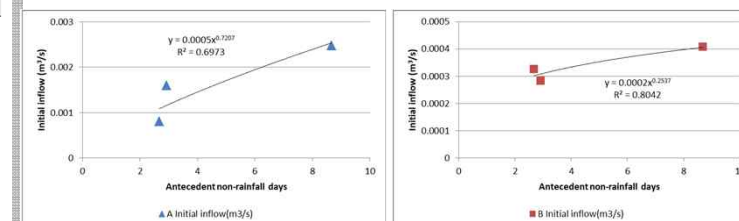
### Initial rainfalls without water level



Type A (Layer with little soil)

Type B (Shallow soil layer)

### Initial rainfalls with water level



Type A (Layer with little soil)

Type B (Shallow soil layer)

## 4. References

- Forest ecosystem service of Gotjawal in Jeju Island. 2018. Hyun et al. National Institute of Forest Science. 16pp.
- Gotjawal forest in Jeju Island as in internationally important wetland. 2009. Jang and Lee, Journal of Wetlands Research. 11(1), 99-104.