

Monitoring Planimetric and Volumetric Changes on Active Sand Dunes

James R Zimbelman¹ and Andrew D Valdez²

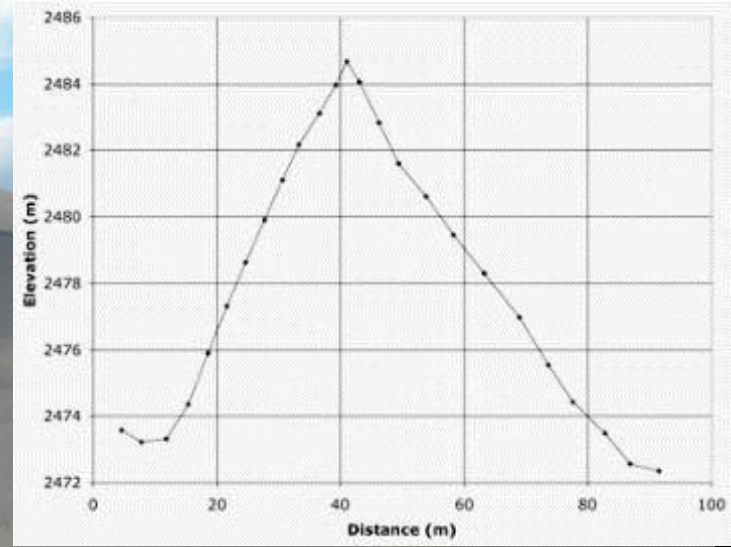
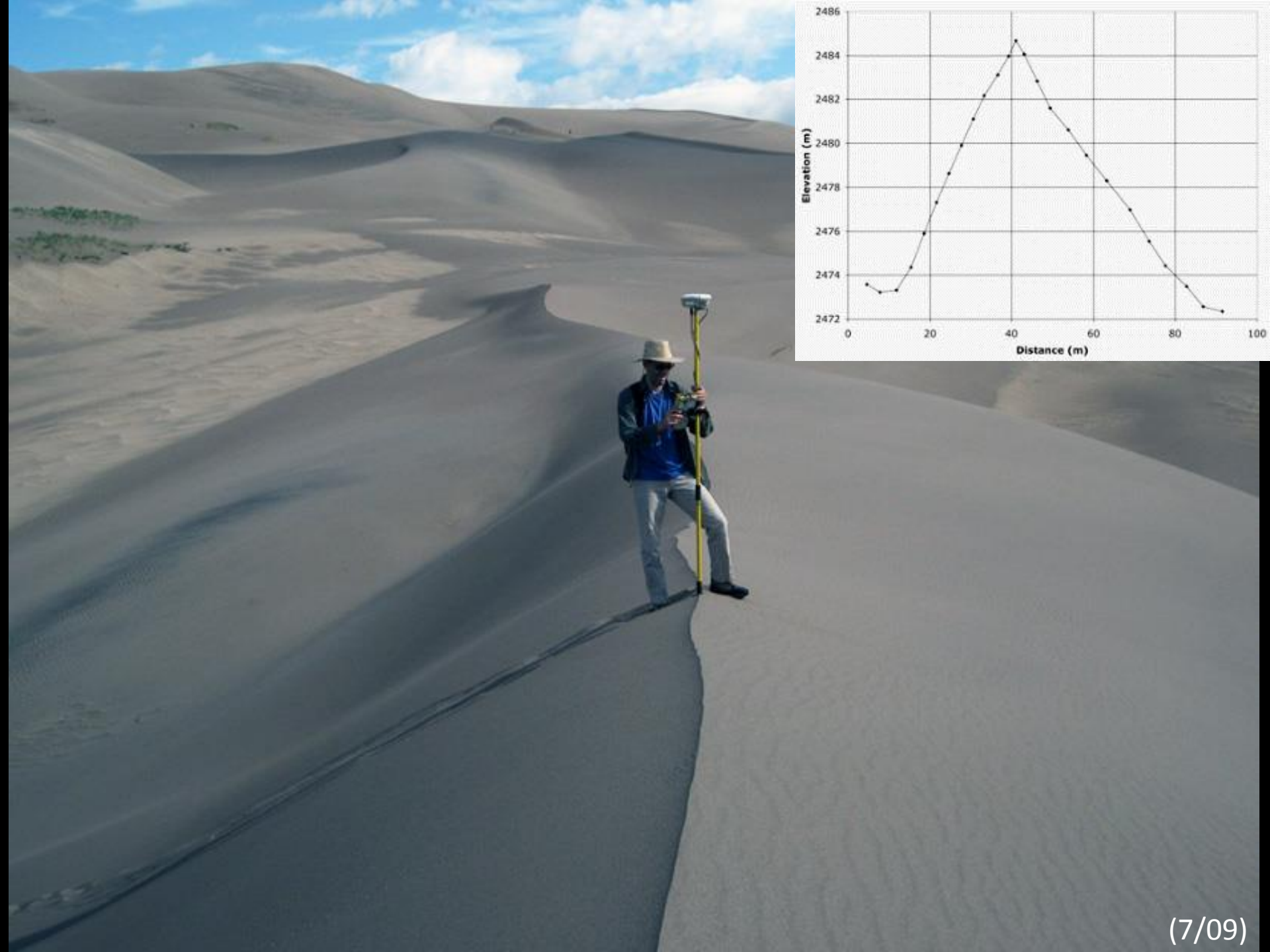
¹Center for Earth and Planetary Studies, National Air and Space Museum,
Smithsonian Institution, Washington, DC

²Great Sand Dunes National Park and Preserve, Mosca, CO

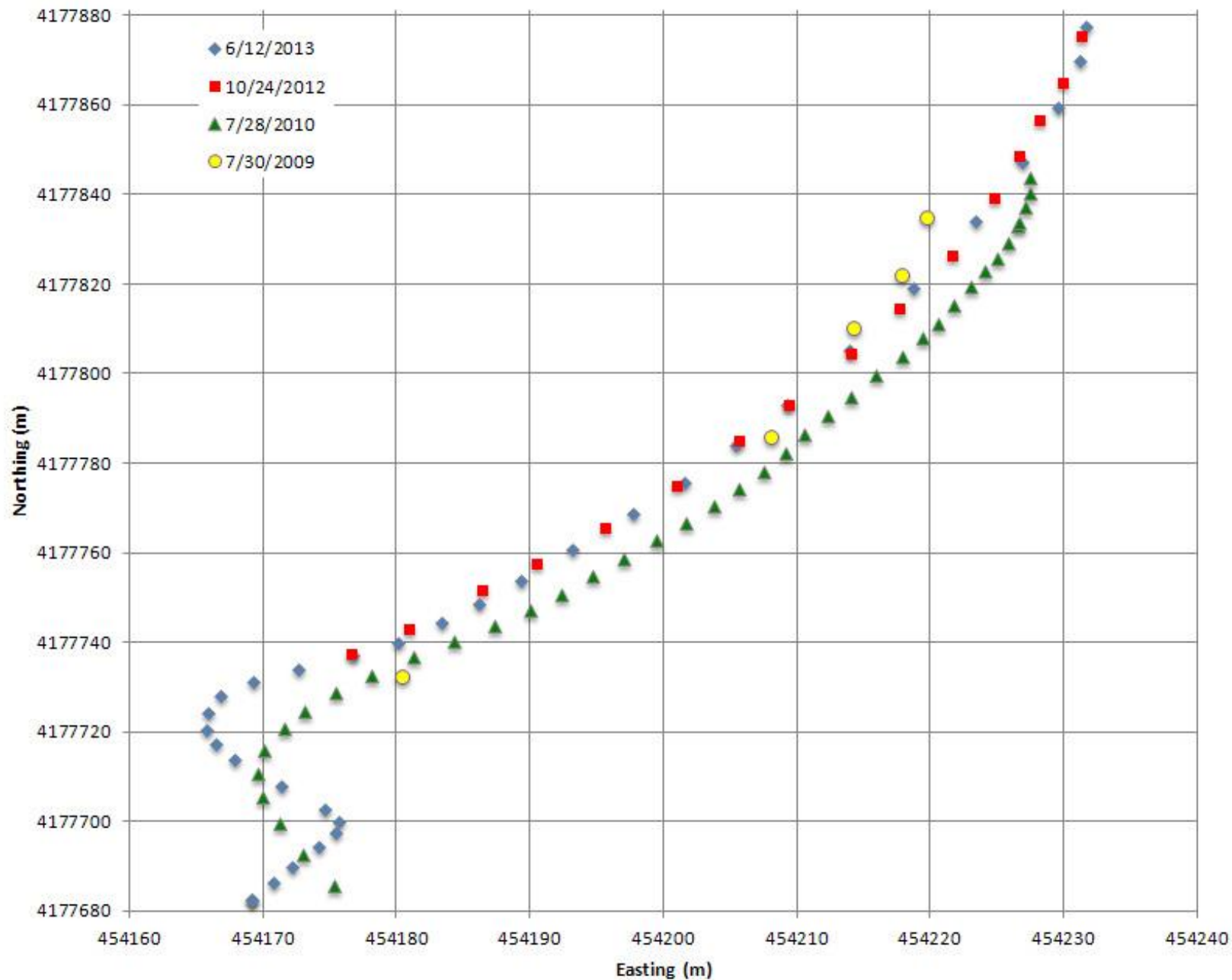


Great Sand Dunes National Park and Preserve, Colorado

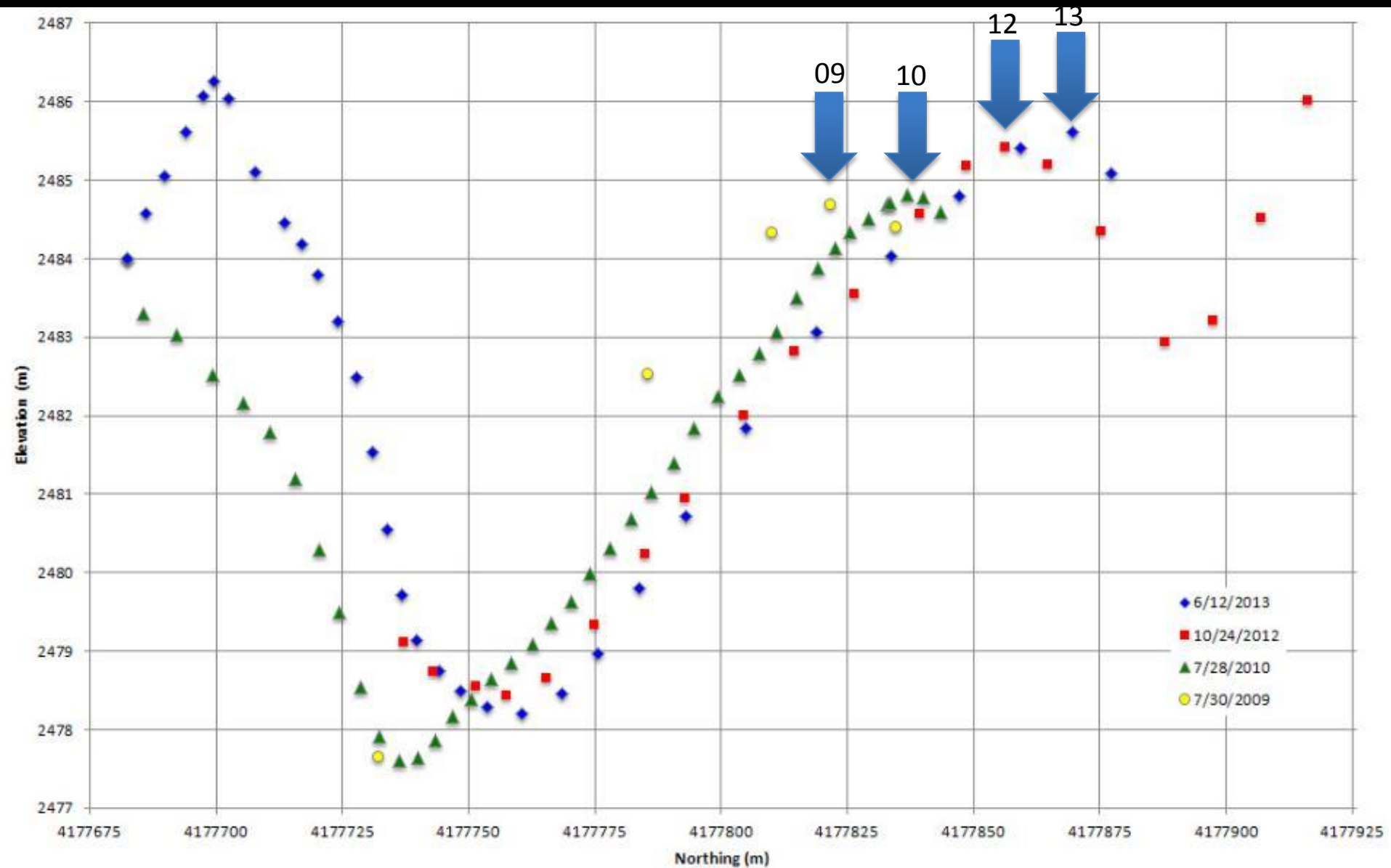




Easting vs Northing: Inconsistent shift to the East



Northing vs Elevation: Consistent extension to the North





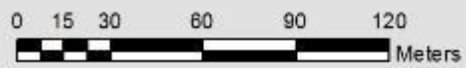
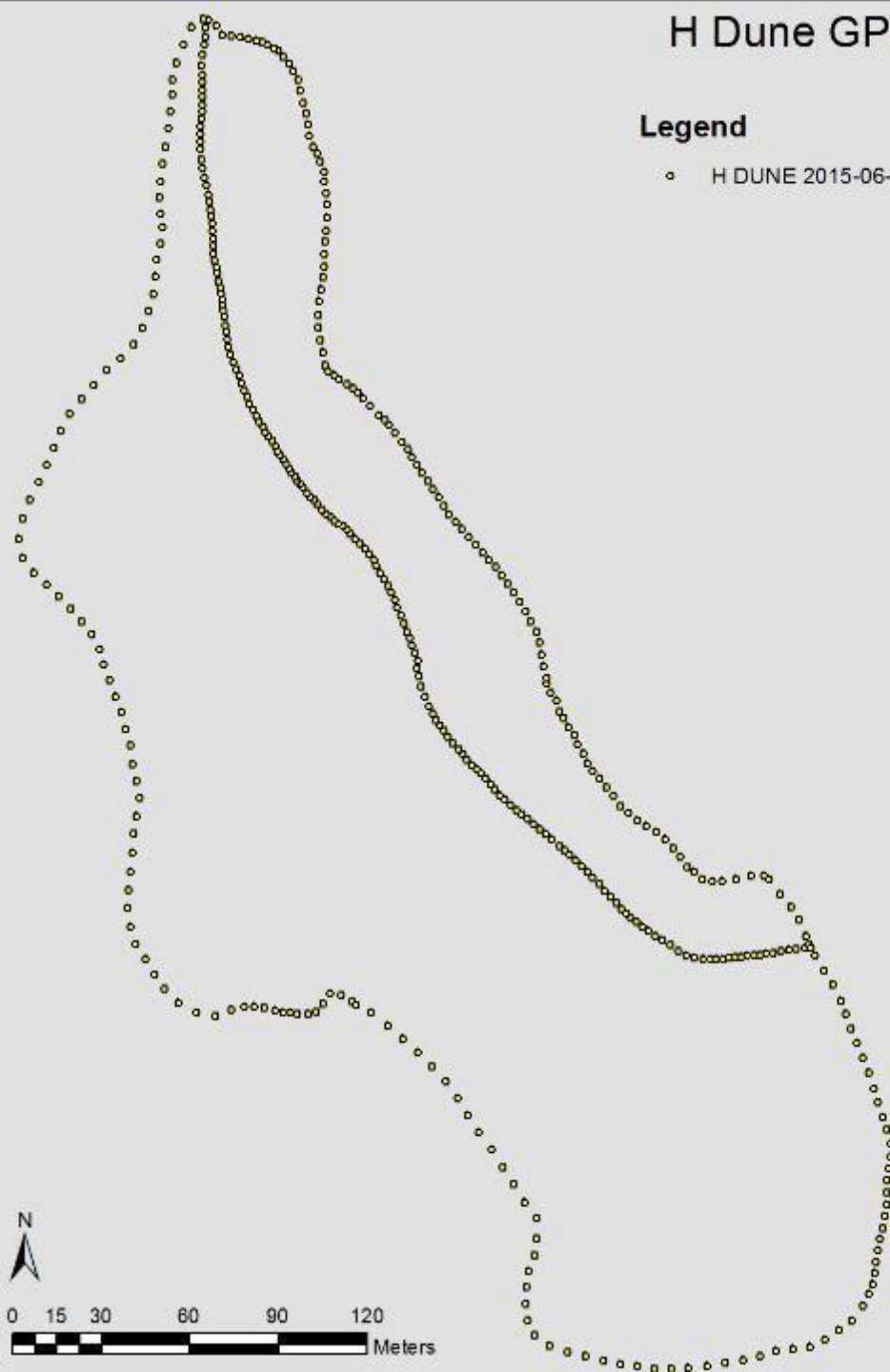
2015



H Dune GPS Points

Legend

- H DUNE 2015-06-12 GPS Points



H Dune Triangulated Irregular Network generated from GPS data

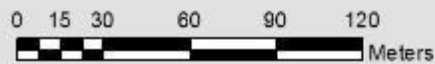
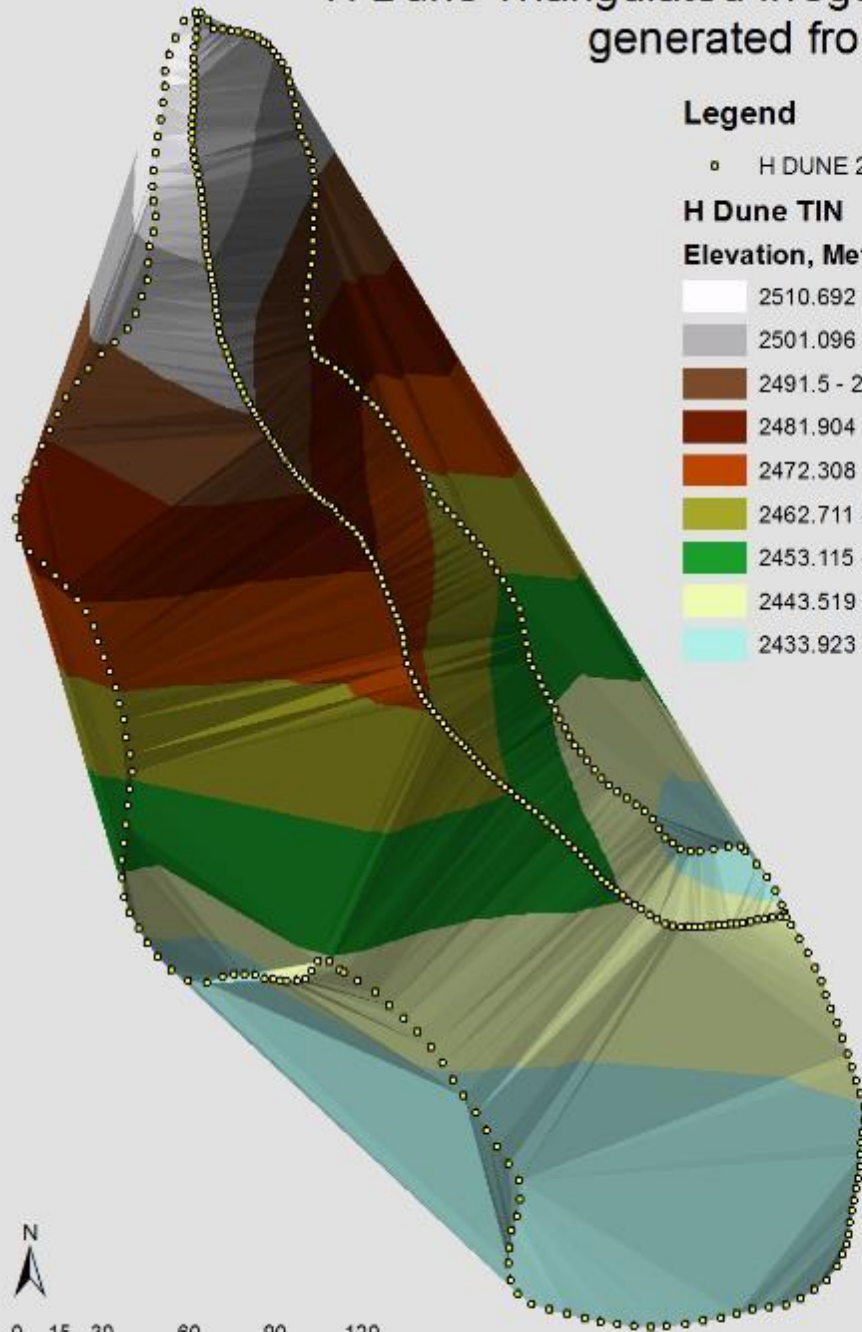
Legend

◻ H DUNE 2015-06-12 GPS Points

H Dune TIN

Elevation, Meters

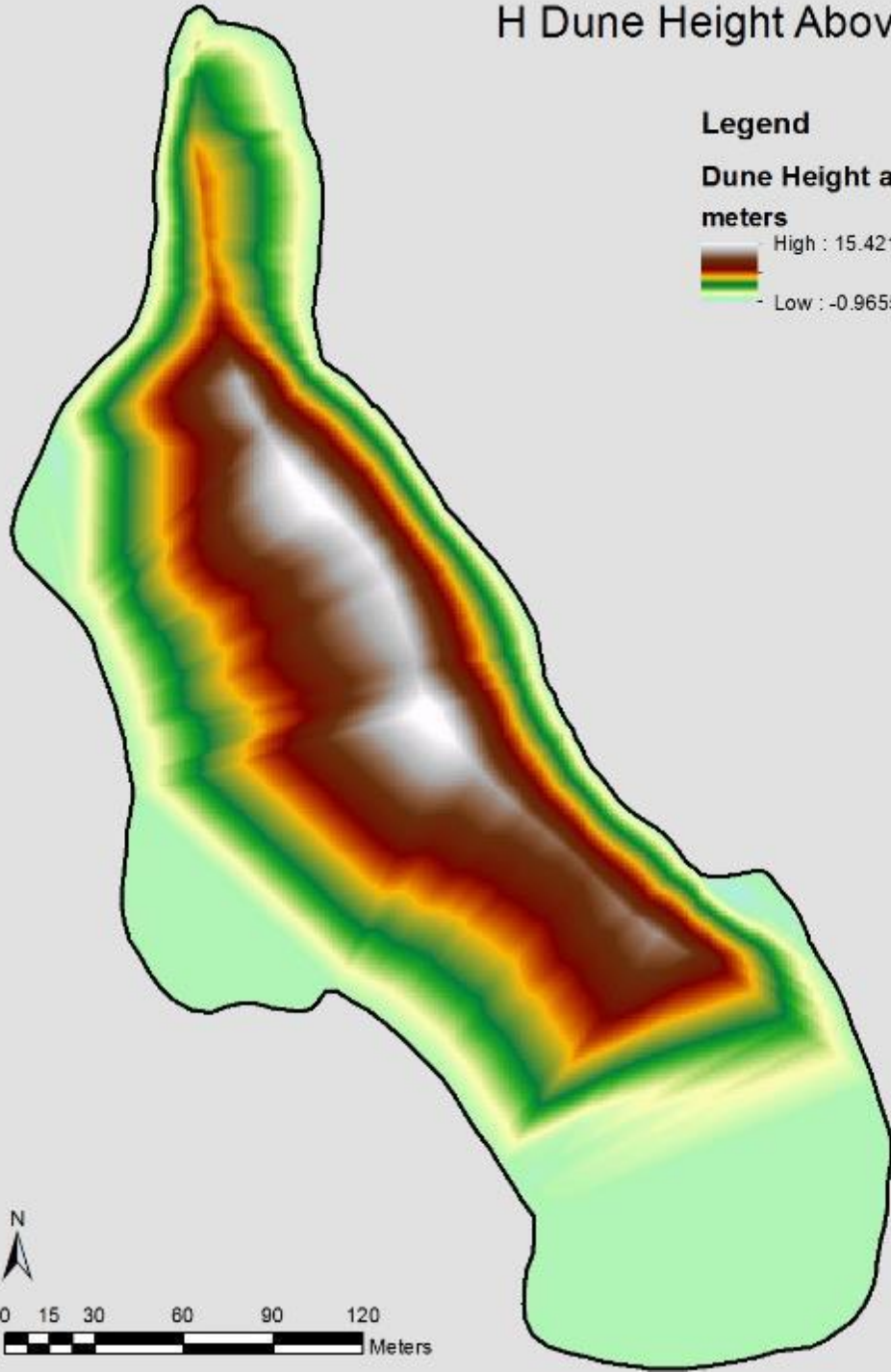
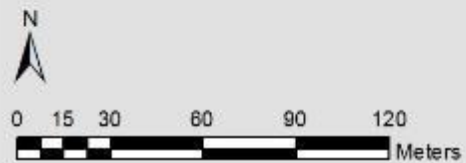
◻	2510.692 - 2520.288
◻	2501.096 - 2510.692
◻	2491.5 - 2501.096
◻	2481.904 - 2491.5
◻	2472.308 - 2481.904
◻	2462.711 - 2472.308
◻	2453.115 - 2462.711
◻	2443.519 - 2453.115
◻	2433.923 - 2443.519



H Dune Height Above Base

Legend

Dune Height above base
meters



H Dune Elevation from 2011 Lidar

Legend

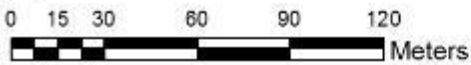
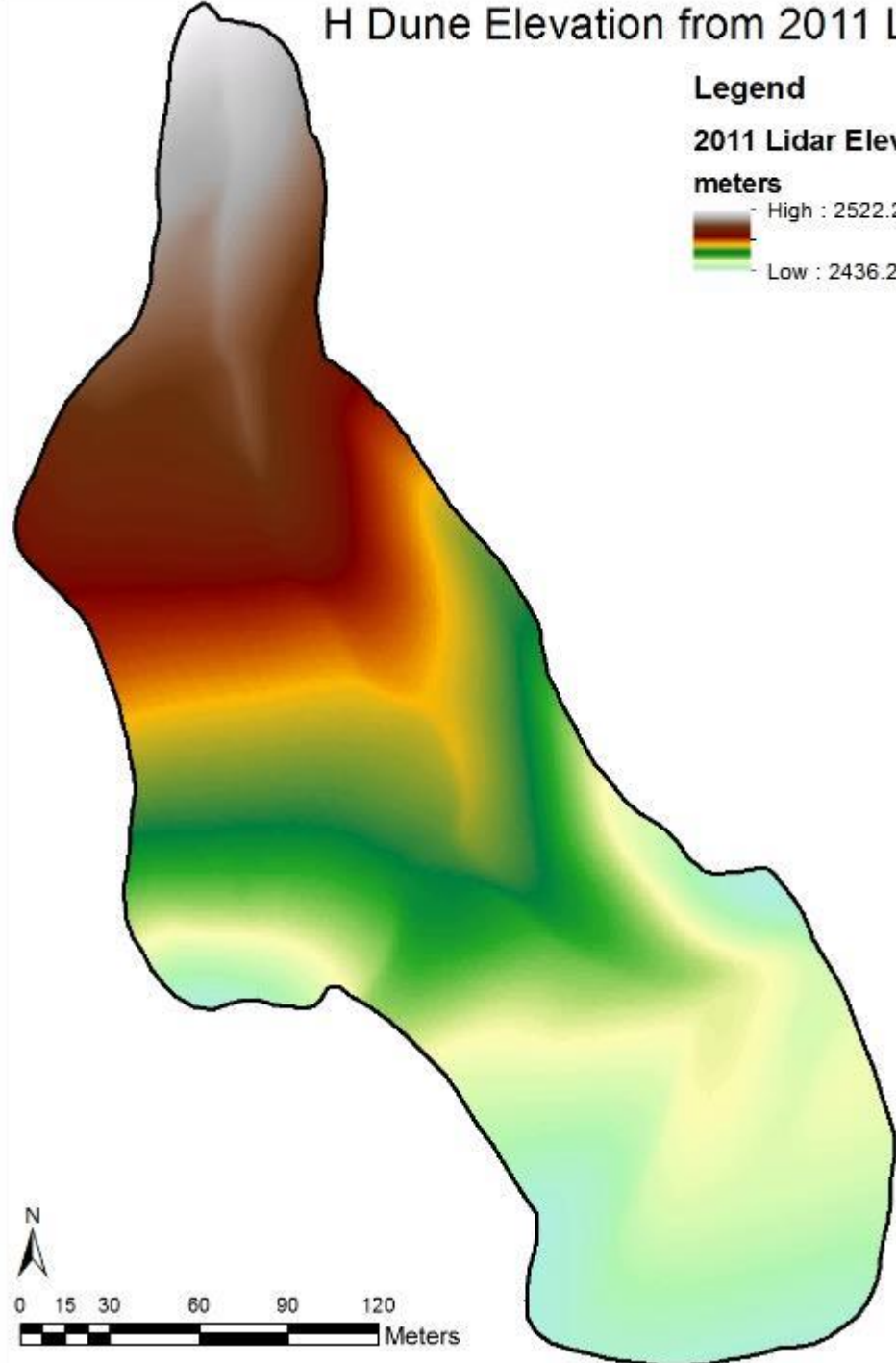
2011 Lidar Elevation

meters

High : 2522.22



Low : 2436.27



H Dune Height from 2011 Lidar

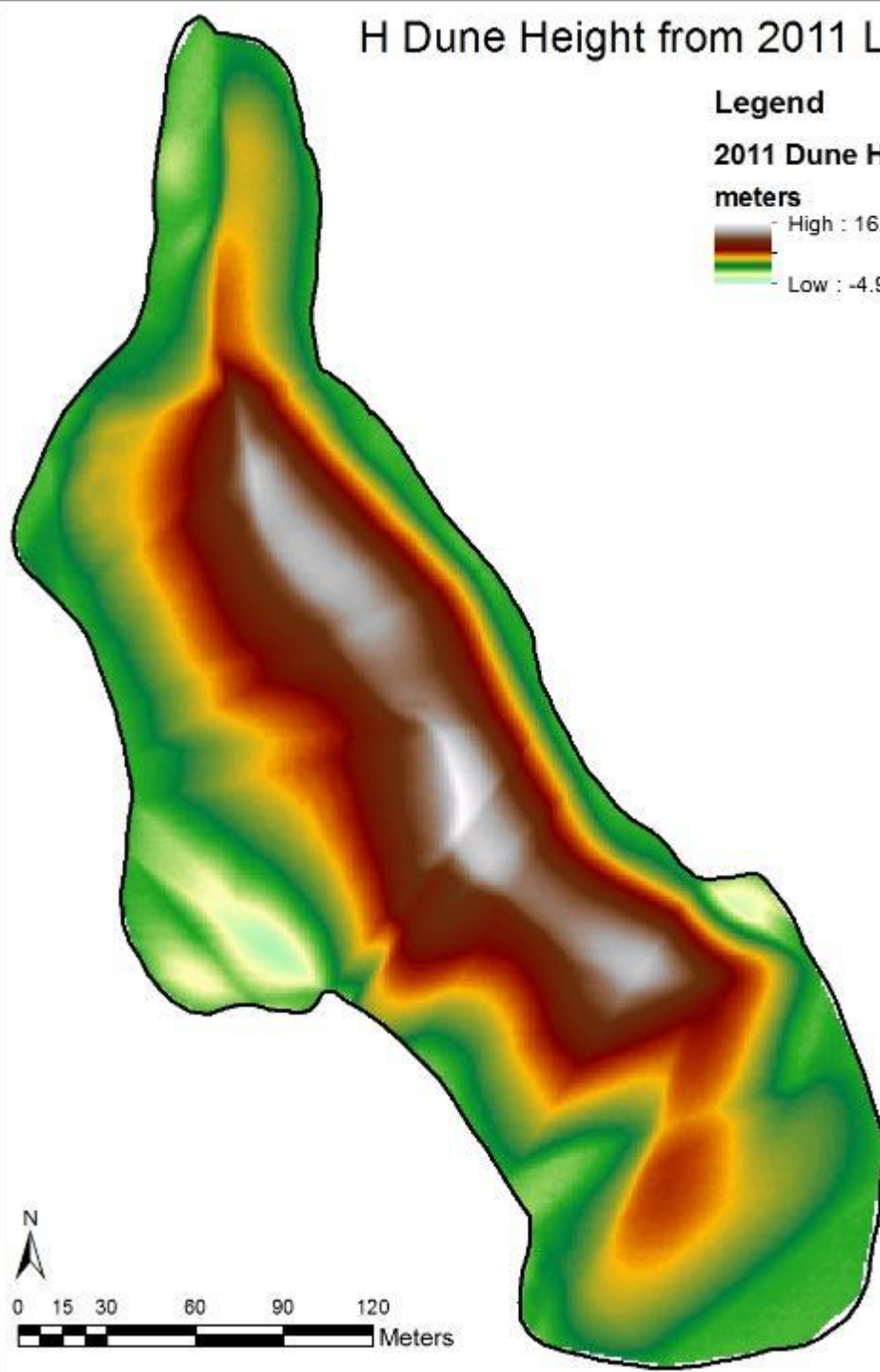
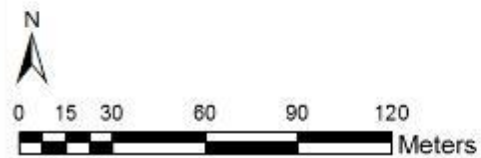
Legend

2011 Dune Height

meters

High : 16.2461

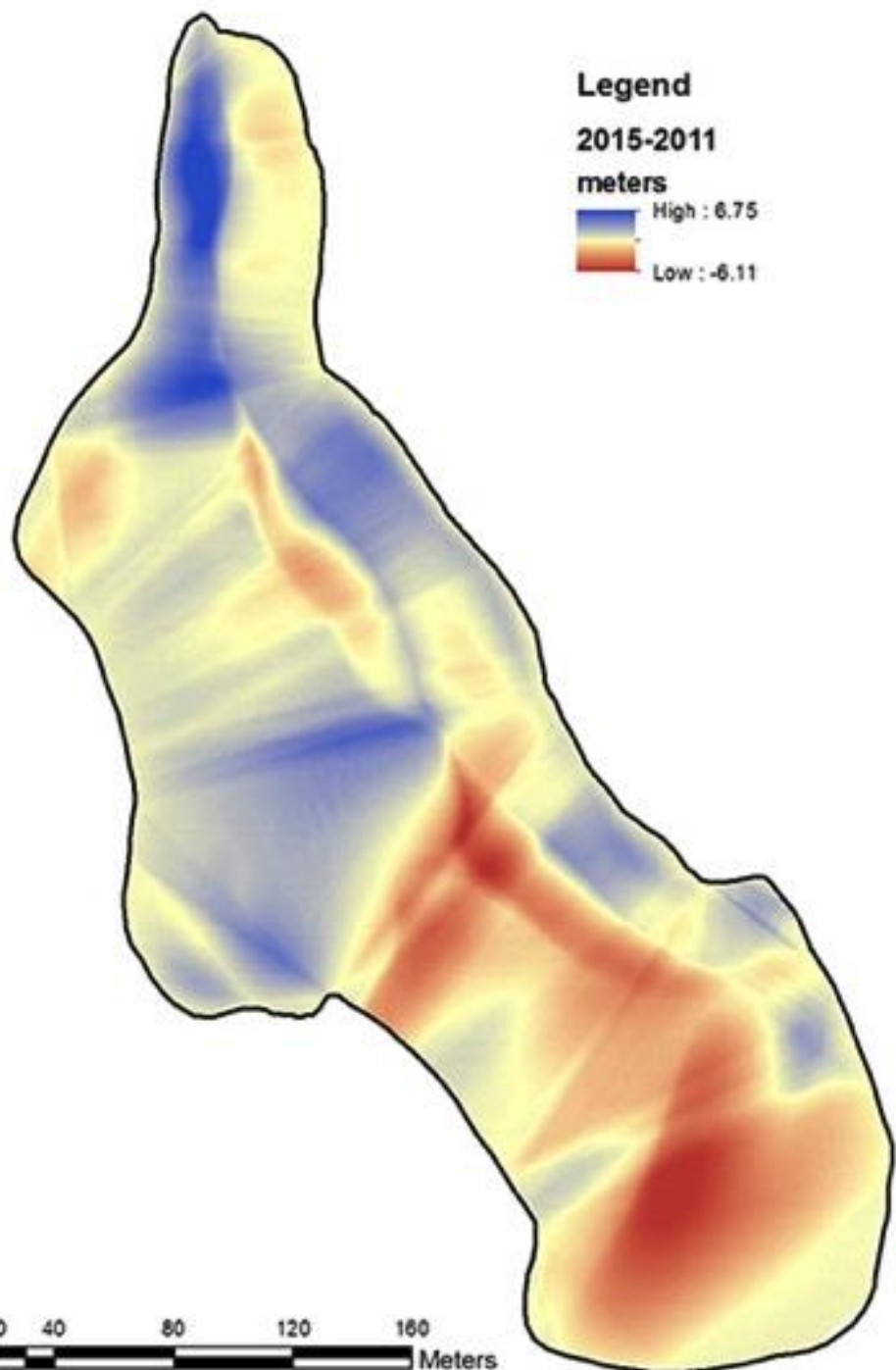
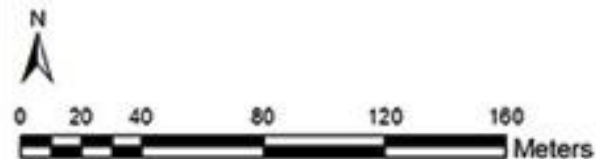
Low : -4.96973



Legend

2015-2011

meters



Summary

- Monitoring the crest of an active reversing dune showed inconsistent movement to E, but extension to N (2009-2013).
- Documenting both crest and dune shape will provide a better record of how the sand is being actively redistributed.