



Fish Finders - Lesson 1: Activity

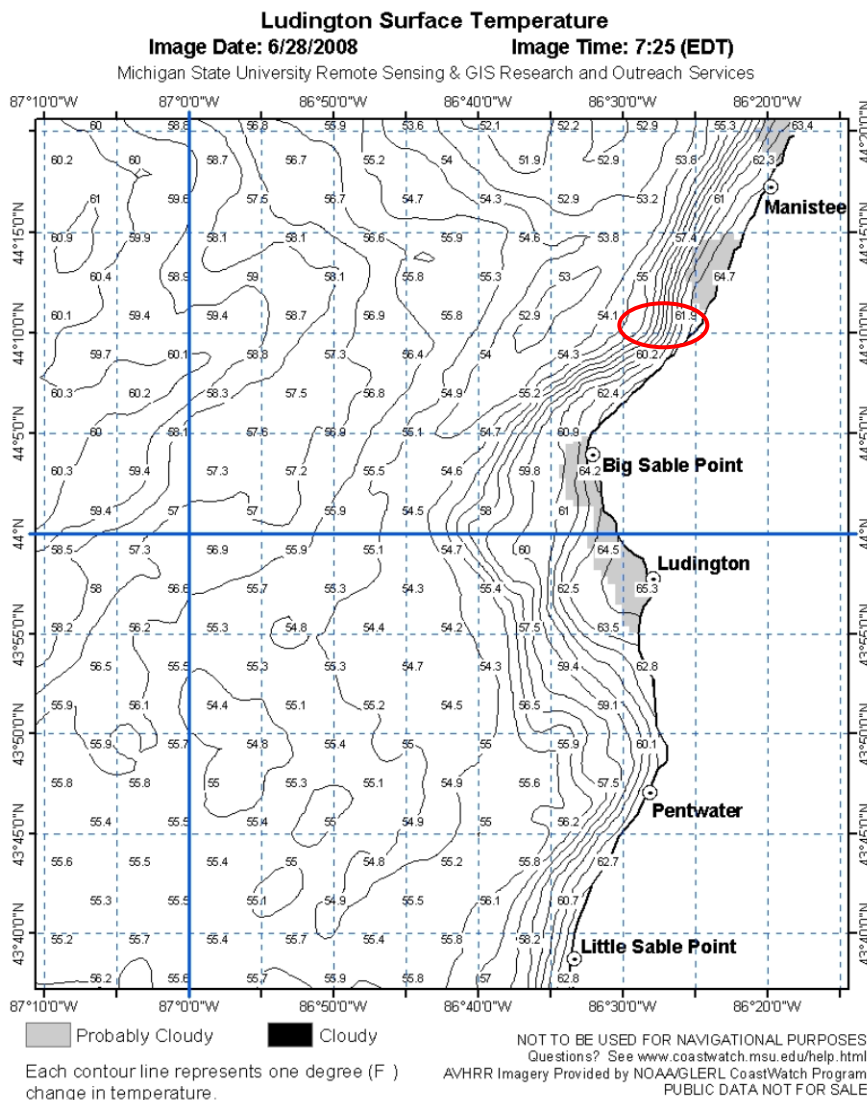
Fishing for Steelhead in Lake Michigan... Find the Break!

Data Sheet Key

Thermal fronts are the regions where water masses with different temperatures meet. Commercial, subsistence and recreational fishermen use surface temperatures to find fish. Thermal fronts are good places to fish for two reasons:

- Prey fish are concentrated between water masses attracting predator fish.
- Fish are more likely to find their optimal temperatures at thermal breaks.

Using what you know about steelhead and thermal fronts, answer the following questions:



1. As winter changes to summer (April to mid-June), thermal fronts form when warmer near shore waters meet colder off shore waters. A thermal front is visible near shore on surface water temperature image below. Areas in which the temperature changes fast over a short distance are typically good places to find fish.

- Based on what you know about thermal fronts, circle where you would fish
- What is the range of temperatures across the width of this front?

Temperatures range from 55 °F to 60.2 °F



2. Use a map (or your favorite internet mapping tool) to find the city and harbor nearest to your selected fishing location. Write out driving directions from your school to the harbor.

3. After launching your vessel, you are ready to navigate to your fishing location. Using a chart, write down the latitude and longitude coordinates you will use to navigate to your location.

Latitude: **44 degrees 10 minutes 10 seconds North**

Longitude: **86 degrees 30 minutes 0 seconds West**

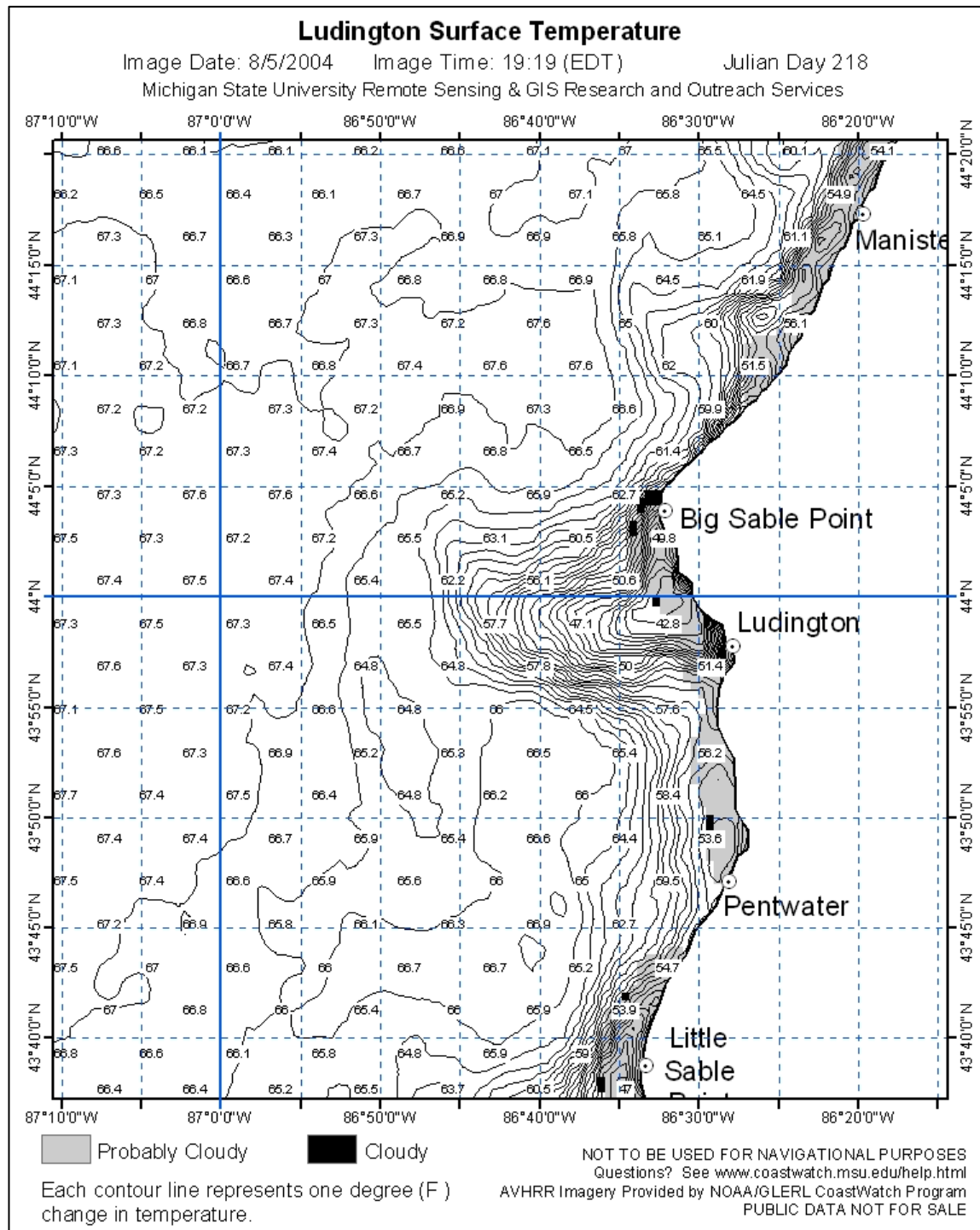
4. Later in the season, fishing is influenced by surface water temperatures associated with upwelling. Upwelling occurs when strong winds push away surface waters allowing deeper, colder waters to rise to the surface. A good example is near Big Sable Point in eastern Lake Michigan (north of Ludington).

The bathymetry near Big Sable Point contributes to cold water upwelling associated with strong winds from the northeast or northwest. Near Big Sable Point, Lake Michigan becomes very deep just offshore. As warm surface waters are pushed away by winds, colder bottom waters upwell to the surface.

- Match the wind speeds and directions with surface water temperature images
 Map A = Wind data **2** (**Strong winds from the north and NE cause upwelling**)
 Map B = Wind data **3** (**Winds from the south and SW do not cause upwelling**)
 Map C = Wind data **1** (**Weak north, northeast and northwest winds result in minor upwelling**)



Map A





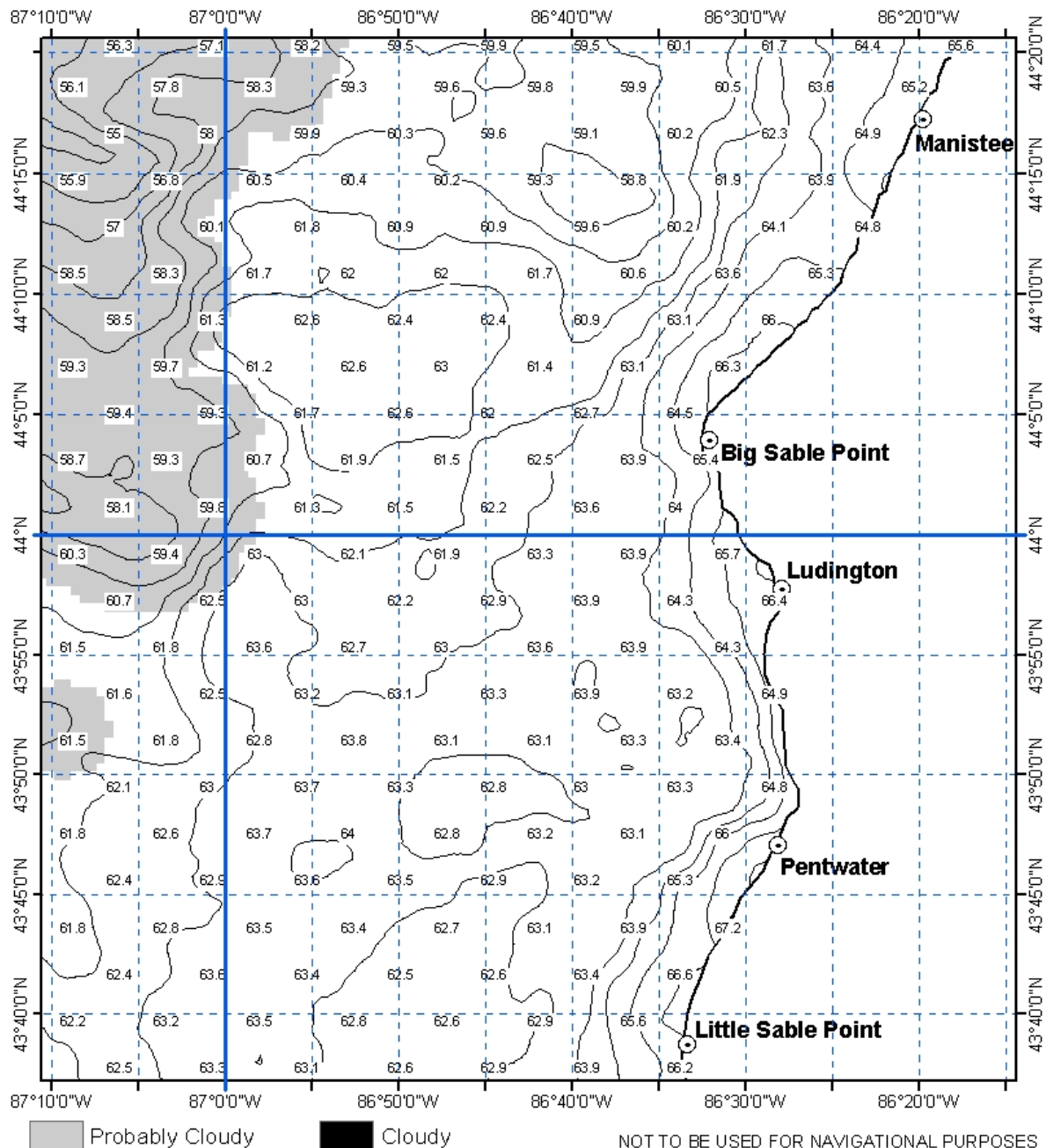
Map B

Ludington Surface Temperature

Image Date: 7/15/2008

Image Time: 3:03 (EDT)

Michigan State University Remote Sensing & GIS Research and Outreach Services

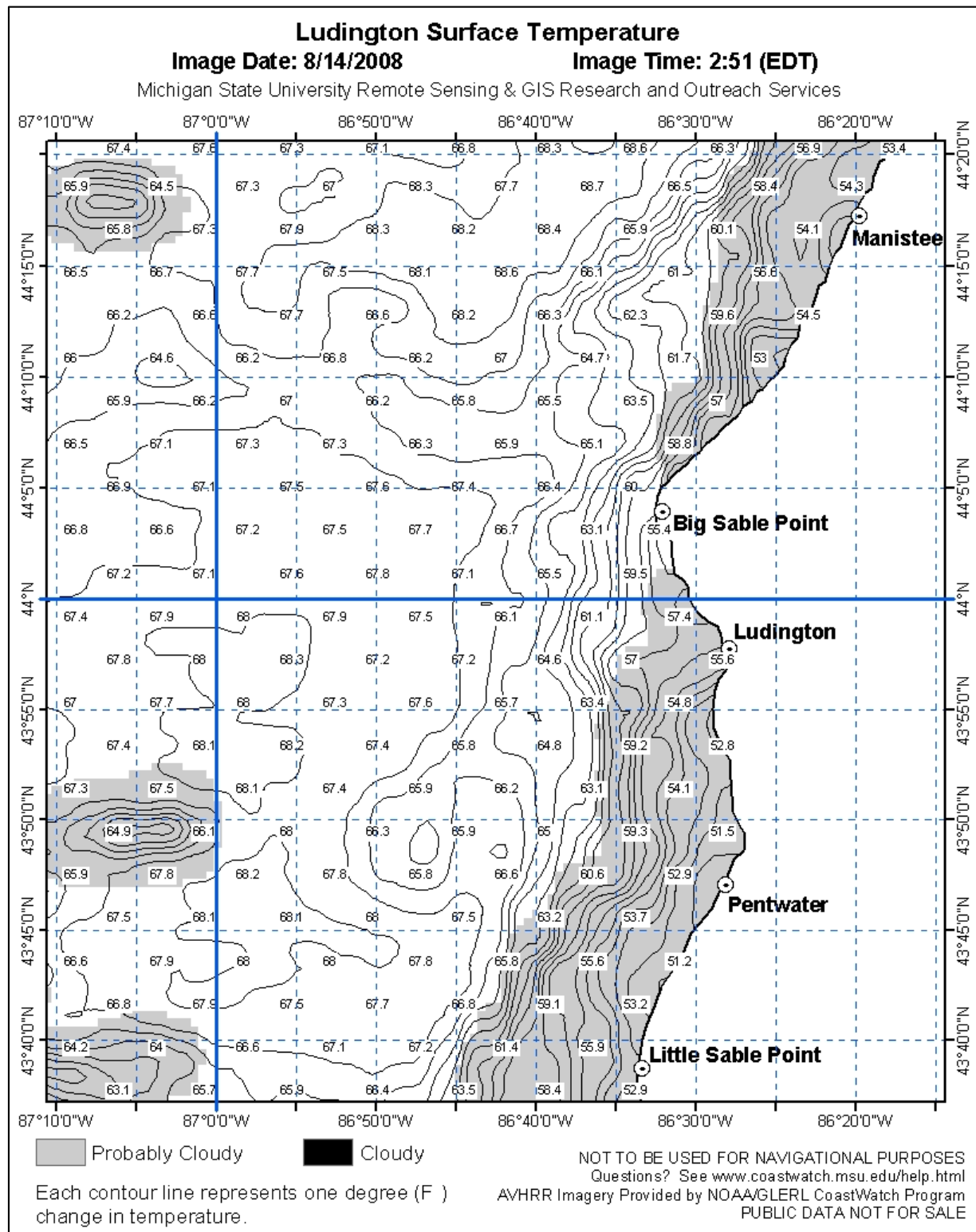


Each contour line represents one degree (F)
change in temperature.

NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Questions? See www.coastwatch.msu.edu/help.html
AVHRR Imagery Provided by NOAA/GLERL CoastWatch Program
PUBLIC DATA NOT FOR SALE



Map C





Wind data 1

Month	Date	Year	Hour	Wind direction	Wind speed (m/s)	Wind speed (mph)
8	13	2008	12:00	North	0.2	0.4
8	13	2008	13:00	South	0.8	1.8
8	13	2008	14:00	West	0.9	2.0
8	13	2008	15:00	South-west	1.1	2.5
8	13	2008	16:00	South-west	1.0	2.2
8	13	2008	17:00	North-west	2.4	5.4
8	13	2008	18:00	North-west	1.8	4.0
8	13	2008	19:00	North-west	2.3	5.1
8	13	2008	20:00	North-west	2.0	4.5
8	13	2008	21:00	North-west	1.8	4.0
8	13	2008	22:00	North	2.2	4.9
8	13	2008	23:00	North	2.7	6.0
8	14	2008	0:00	North	1.9	4.3
8	14	2008	1:00	North	1.0	2.2
8	14	2008	2:00	North-east	1.3	2.9
8	14	2008	3:00	East	1.1	2.5
8	14	2008	4:00	East	0.1	0.2
8	14	2008	5:00	North-east	0.4	0.9
8	14	2008	6:00	North-east	0.8	1.8
8	14	2008	7:00	North-east	0.8	1.8
8	14	2008	8:00	North-east	1.3	2.9
8	14	2008	9:00	North-east	0.7	1.6
8	14	2008	10:00	North-east	1.3	2.9
8	14	2008	11:00	East	1.3	2.9
8	14	2008	12:00	East	1.7	3.8
8	14	2008	13:00	East	2.0	4.5
8	14	2008	14:00	East	0.7	1.6
8	14	2008	15:00	West	2.7	6.0



Wind data 2

Month	Date	Year	Time	Wind direction	Wind speed (m/s)	Wind speed (mph)
8	5	2004	0:00	North	10.4	23.3
8	5	2004	1:00	North-east	10.1	22.6
8	5	2004	2:00	North	10.1	22.6
8	5	2004	3:00	North	9.7	21.7
8	5	2004	4:00	North	8.7	19.5
8	5	2004	5:00	North	9.0	20.1
8	5	2004	6:00	North	10.4	23.3
8	5	2004	7:00	North	9.9	22.1
8	5	2004	8:00	North	8.0	17.9
8	5	2004	9:00	North	6.9	15.4
8	5	2004	10:00	North	7.1	15.9
8	5	2004	11:00	North	6.9	15.4
8	5	2004	12:00	North	6.8	15.2
8	5	2004	13:00	North	6.7	15.0
8	5	2004	14:00	North	6.2	13.9
8	5	2004	15:00	North	6.7	15.0
8	5	2004	16:00	North	6.6	14.8
8	5	2004	17:00	North	6.0	13.4
8	5	2004	18:00	North	5.0	11.2
8	5	2004	19:00	North	7.3	16.3
8	5	2004	20:00	North	6.1	13.6
8	5	2004	21:00	North	5.9	13.2
8	5	2004	22:00	North	5.5	12.3
8	5	2004	23:00	North	5.0	11.2



Wind data 3

Year	Month	Day	Time	Wind direction	Wind speed (m/s)	Wind speed (mph)
2008	7	15	00:00	South	3.6	8.1
2008	7	15	01:00	South	3.4	7.6
2008	7	15	02:00	South-west	5.6	12.5
2008	7	15	03:00	South	4.2	9.4
2008	7	15	04:00	South	4.6	10.3
2008	7	15	05:00	South	4.7	10.5
2008	7	15	06:00	South	4.0	8.9
2008	7	15	07:00	South	4.5	10.1
2008	7	15	08:00	South	5.3	11.9
2008	7	15	09:00	South	6.5	14.5
2008	7	15	10:00	South	5.7	12.8
2008	7	15	11:00	South	5.8	13.0
2008	7	15	12:00	South	6.2	13.9
2008	7	15	13:00	South	6.0	13.4
2008	7	15	14:00	North	4.1	9.2
2008	7	15	15:00	South	3.5	7.8
2008	7	15	16:00	South	5.7	12.8
2008	7	15	17:00	South	7.0	15.7
2008	7	15	18:00	South	7.9	17.7
2008	7	15	19:00	South	7.3	16.3
2008	7	15	20:00	South	8.1	18.1
2008	7	15	21:00	South	7.4	16.6
2008	7	15	22:00	South	6.3	14.1