Whale Travel Analysis

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Load Whale Data

Load the processed whale data and extract data for a single whale.

```
load("/MATLAB Drive/practical matlab skills/course_data/Blue Whales Argos Data/cleanWhaleData.mat")

id = "2008CA-Bmu-04176"
```

```
id =
"2008CA-Bmu-04176"
```

```
whaleIndices = whales.ID == id
```

```
whaleIndices = 14514×1 logical array
   0
   0
   0
   0
   0
   0
   0
   0
   0
   0
   0
   0
   0
   0
   0
   0
   ⋮
```

```
whale = whales(whaleIndices,:)
```

whale = 259×8 table

...

	ID	timestamp	longitude	latitude	sensorQuality
1	2008CA-Bmu-04176	2008-07-28 00:40:25.000	-120.0440	34.1340	0
2	2008CA-Bmu-04176	2008-07-28 21:24:11.000	-120.6060	34.1150	0
3	2008CA-Bmu-04176	2008-07-29 21:11:49.000	-119.1460	33.2770	A

	ID	timestamp	longitude	latitude	sensorQuality
4	2008CA-Bmu-04176	2008-07-30 13:52:54.000	-120.0030	31.9730	B
5	2008CA-Bmu-04176	2008-08-01 00:43:05.000	-119.2100	31.2420	0
6	2008CA-Bmu-04176	2008-08-01 13:45:07.000	-119.2250	31.2030	0
7	2008CA-Bmu-04176	2008-08-02 00:15:53.000	-119.3980	31.2690	B
8	2008CA-Bmu-04176	2008-08-02 01:01:38.000	-119.2560	31.2220	B
9	2008CA-Bmu-04176	2008-08-02 10:50:19.000	-119.3380	31.2270	1
10	2008CA-Bmu-04176	2008-08-02 13:28:52.000	-119.3360	31.2550	1
11	2008CA-Bmu-04176	2008-08-03 00:54:28.000	-119.1410	31.3110	0
12	2008CA-Bmu-04176	2008-08-03 10:39:27.000	-119.0370	31.3630	A
13	2008CA-Bmu-04176	2008-08-03 13:18:47.000	-118.9730	31.3520	1
14	2008CA-Bmu-04176	2008-08-03 13:55:42.000	-118.9720	31.3250	A
15	2008CA-Bmu-04176	2008-08-03 21:59:34.000	-119.0060	31.3890	A
16	2008CA-Bmu-04176	2008-08-04 10:28:45.000	-119.1730	31.2570	2
17	2008CA-Bmu-04176	2008-08-04 13:05:09.000	-119.0720	31.3440	1
18	2008CA-Bmu-04176	2008-08-04 21:52:23.000	-119.0980	31.5560	0
19	2008CA-Bmu-04176	2008-08-05 00:28:43.000	-119.2520	31.7170	1
20	2008CA-Bmu-04176	2008-08-05 10:19:34.000	-119.2350	31.9560	0
21	2008CA-Bmu-04176	2008-08-05 13:06:19.000	-119.2520	31.9990	0
22	2008CA-Bmu-04176	2008-08-05 21:37:46.000	-119.2030	31.8710	0
23	2008CA-Bmu-04176	2008-08-06 00:19:13.000	-119.1360	31.8750	0
24	2008CA-Bmu-04176	2008-08-06 00:24:17.000	-119.0010	31.8320	B

	ID	timestamp	longitude	latitude	sensorQuality
25	2008CA-Bmu-04176	2008-08-06 10:10:14.000	-118.8020	31.7560	1
26	2008CA-Bmu-04176	2008-08-07 00:02:53.000	-118.4630	31.9410	B
27	2008CA-Bmu-04176	2008-08-07 00:05:17.000	-118.4840	31.8690	1
28	2008CA-Bmu-04176	2008-08-07 21:19:35.000	-118.4670	32.0740	1
29	2008CA-Bmu-04176	2008-08-08 13:57:53.000	-118.4310	32.1430	A
30	2008CA-Bmu-04176	2008-08-09 00:50:26.000	-118.4070	32.0680	2
31	2008CA-Bmu-04176	2008-08-09 13:10:43.000	-118.3980	32.1160	0
32	2008CA-Bmu-04176	2008-08-09 13:47:12.000	-118.4170	32.1300	0
33	2008CA-Bmu-04176	2008-08-10 00:28:59.000	-118.7140	32.2030	0
34	2008CA-Bmu-04176	2008-08-10 13:36:48.000	-118.5200	32.5090	1
35	2008CA-Bmu-04176	2008-08-11 00:05:06.000	-118.3540	32.4750	B
36	2008CA-Bmu-04176	2008-08-11 00:58:46.000	-118.3350	32.4700	0
37	2008CA-Bmu-04176	2008-08-11 10:56:54.000	-118.2620	32.5060	A
38	2008CA-Bmu-04176	2008-08-11 13:22:36.000	-118.2740	32.5350	2
39	2008CA-Bmu-04176	2008-08-11 14:03:12.000	-118.3060	32.5480	B
40	2008CA-Bmu-04176	2008-08-12 00:46:35.000	-118.0130	32.5410	A
41	2008CA-Bmu-04176	2008-08-12 10:47:32.000	-118.2550	32.5640	1
42	2008CA-Bmu-04176	2008-08-13 00:31:35.000	-118.1720	32.6870	1
43	2008CA-Bmu-04176	2008-08-13 00:55:46.000	-118.1420	32.6660	A
44	2008CA-Bmu-04176	2008-08-13 10:34:25.000	-118.3770	32.6290	2
45	2008CA-Bmu-04176	2008-08-13 13:05:45.000	-118.2700	32.5770	B

	ID	timestamp	longitude	latitude	sensorQuality
46	2008CA-Bmu-04176	2008-08-14 00:23:27.000	-118.3830	32.7110	0
47	2008CA-Bmu-04176	2008-08-14 00:31:33.000	-118.4950	32.6820	0
48	2008CA-Bmu-04176	2008-08-14 10:23:47.000	-118.2660	32.7770	1
49	2008CA-Bmu-04176	2008-08-14 21:47:40.000	-118.2700	32.8660	1
50	2008CA-Bmu-04176	2008-08-15 00:09:31.000	-118.2620	32.8580	2
51	2008CA-Bmu-04176	2008-08-15 00:10:09.000	-118.2860	32.8590	1
52	2008CA-Bmu-04176	2008-08-15 10:16:13.000	-118.2930	32.7620	1
53	2008CA-Bmu-04176	2008-08-15 21:35:34.000	-117.9960	32.7600	1
54	2008CA-Bmu-04176	2008-08-16 10:06:42.000	-117.8970	32.5900	A
55	2008CA-Bmu-04176	2008-08-16 13:46:32.000	-117.9440	32.6640	A
56	2008CA-Bmu-04176	2008-08-16 21:22:50.000	-117.9060	32.3420	0
57	2008CA-Bmu-04176	2008-08-17 01:02:33.000	-118.0540	32.3220	0
58	2008CA-Bmu-04176	2008-08-17 13:19:28.000	-118.6580	32.3100	0
59	2008CA-Bmu-04176	2008-08-17 13:53:13.000	-118.5710	32.3220	0
60	2008CA-Bmu-04176	2008-08-17 21:13:30.000	-118.8610	32.5730	0
61	2008CA-Bmu-04176	2008-08-18 00:35:27.000	-119.2700	32.6460	A
62	2008CA-Bmu-04176	2008-08-18 13:43:59.000	-120.0210	33.0510	1
63	2008CA-Bmu-04176	2008-08-20 11:02:23.000	-122.3600	34.8790	B
64	2008CA-Bmu-04176	2008-08-20 13:18:50.000	-122.3410	35.0050	A
65	2008CA-Bmu-04176	2008-08-20 13:45:20.000	-122.3200	35.0290	0
66	2008CA-Bmu-04176	2008-08-21 00:43:53.000	-123.0780	35.2640	0

	ID	timestamp	longitude	latitude	sensorQuality
67	2008CA-Bmu-04176	2008-08-21 10:50:58.000	-121.9950	35.9290	2
68	2008CA-Bmu-04176	2008-08-21 13:23:46.000	-121.9130	36.0460	1
69	2008CA-Bmu-04176	2008-08-22 00:31:47.000	-121.9860	36.4940	0
70	2008CA-Bmu-04176	2008-08-22 00:43:54.000	-122.0650	36.5060	B
71	2008CA-Bmu-04176	2008-08-22 10:39:43.000	-122.1000	36.9220	0
72	2008CA-Bmu-04176	2008-08-23 21:54:10.000	-122.8860	37.4380	2
73	2008CA-Bmu-04176	2008-08-24 00:09:45.000	-122.9170	37.4560	0
74	2008CA-Bmu-04176	2008-08-24 10:17:52.000	-122.5900	37.4500	0
75	2008CA-Bmu-04176	2008-08-24 13:53:02.000	-122.9080	37.4880	1
76	2008CA-Bmu-04176	2008-08-24 21:46:31.000	-123.0320	37.6400	1
77	2008CA-Bmu-04176	2008-08-25 13:27:39.000	-123.1090	38.2010	B
78	2008CA-Bmu-04176	2008-08-25 14:00:37.000	-123.1710	38.2560	0
79	2008CA-Bmu-04176	2008-08-25 21:35:56.000	-123.2350	38.5190	0
80	2008CA-Bmu-04176	2008-08-26 10:02:33.000	-124.7360	39.0200	B
81	2008CA-Bmu-04176	2008-08-26 13:05:32.000	-123.4580	38.1710	2
82	2008CA-Bmu-04176	2008-08-27 00:22:25.000	-123.1030	37.3400	0
83	2008CA-Bmu-04176	2008-08-29 11:04:29.000	-121.1770	35.1520	B
84	2008CA-Bmu-04176	2008-08-29 13:11:19.000	-121.3060	35.1840	0
85	2008CA-Bmu-04176	2008-08-30 00:34:06.000	-121.3290	34.7580	A
86	2008CA-Bmu-04176	2008-08-30 00:50:35.000	-121.2070	34.7610	0
87	2008CA-Bmu-04176	2008-08-30 11:03:09.000	-121.2630	34.8000	0

	ID	timestamp	longitude	latitude	sensorQuality
88	2008CA-Bmu-04176	2008-08-30 13:08:24.000	-121.2610	34.7870	1
89	2008CA-Bmu-04176	2008-08-31 00:28:06.000	-121.4440	34.7170	A
90	2008CA-Bmu-04176	2008-08-31 10:49:50.000	-121.0870	34.5940	1
91	2008CA-Bmu-04176	2008-09-01 10:38:38.000	-120.4850	33.9610	A
92	2008CA-Bmu-04176	2008-09-01 21:59:03.000	-120.1990	33.3780	1
93	2008CA-Bmu-04176	2008-09-02 10:27:11.000	-120.1030	32.8510	1
94	2008CA-Bmu-04176	2008-09-02 21:50:12.000	-119.9350	32.6060	<undefined>
95	2008CA-Bmu-04176	2008-09-03 00:53:39.000	-119.8160	32.5800	1
96	2008CA-Bmu-04176	2008-09-03 10:15:30.000	-119.6490	32.5020	0
97	2008CA-Bmu-04176	2008-09-03 13:15:30.000	-119.7150	32.4990	0
98	2008CA-Bmu-04176	2008-09-03 13:54:06.000	-119.6790	32.4770	B
99	2008CA-Bmu-04176	2008-09-03 21:41:49.000	-119.5870	32.5140	0
100	2008CA-Bmu-04176	2008-09-04 13:42:29.000	-119.5710	32.4800	0

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Calculate Total Distance

Convert the whale's latitude and longitude values into total distance travelled.

```
lat = deg2rad(whale.latitude);
lon = deg2rad(whale.longitude);
```

```
R = 6371; % Earth radius in km

dlat = diff(lat);
dlon = diff(lon);
```

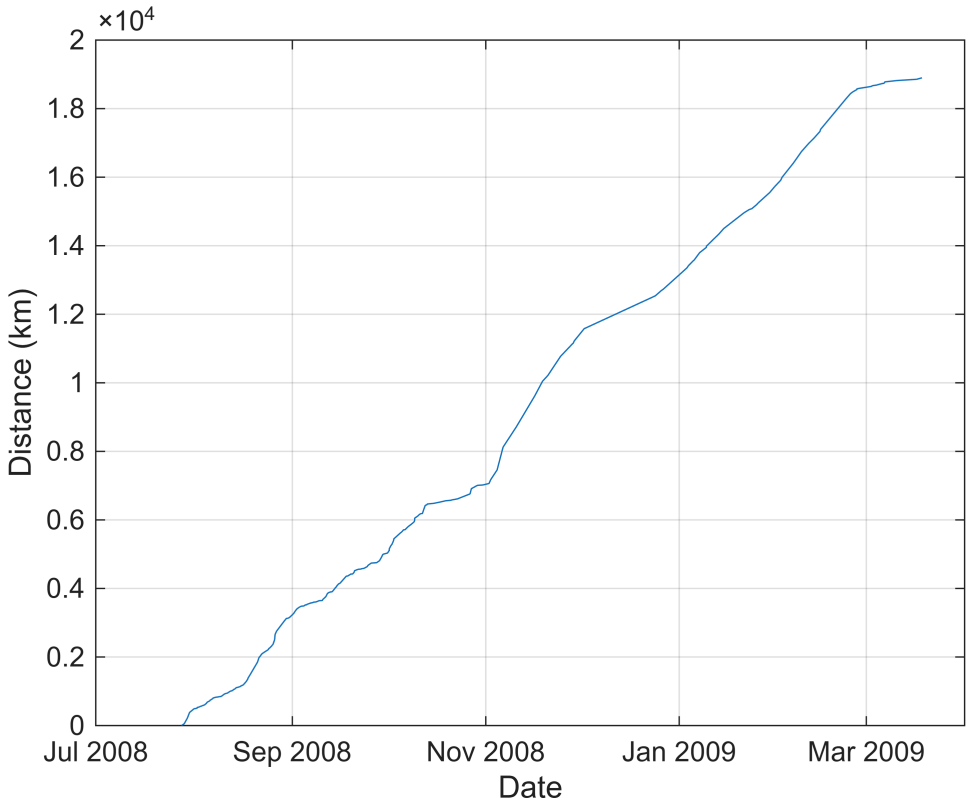
```
a = sin(dlat/2).^2 + ...
    cos(lat(1:end-1)) .* cos(lat(2:end)) .* sin(dlon/2).^2;

c = 2 * atan2(sqrt(a), sqrt(1 - a));

segmentDistance = R * c;

whale.distance = [0; cumsum(segmentDistance)];

plot(whale.timestamp, whale.distance)
xlabel("Date")
ylabel("Distance (km)")
grid on
```



Calculate Elapsed Time

Convert the absolute date and time values into elapsed time in days.

```
whale.elapsedDays = days(whale.timestamp-whale.timestamp(1))
```

```
whale = 259×10 table
                                                                    ...
```

	ID	timestamp	longitude	latitude	sensorQuality
1	2008CA-Bmu-04176	2008-07-28 00:40:25.000	-120.0440	34.1340	0
2	2008CA-Bmu-04176	2008-07-28 21:24:11.000	-120.6060	34.1150	0
3	2008CA-Bmu-04176	2008-07-29 21:11:49.000	-119.1460	33.2770	A
4	2008CA-Bmu-04176	2008-07-30 13:52:54.000	-120.0030	31.9730	B
5	2008CA-Bmu-04176	2008-08-01 00:43:05.000	-119.2100	31.2420	0
6	2008CA-Bmu-04176	2008-08-01 13:45:07.000	-119.2250	31.2030	0
7	2008CA-Bmu-04176	2008-08-02 00:15:53.000	-119.3980	31.2690	B
8	2008CA-Bmu-04176	2008-08-02 01:01:38.000	-119.2560	31.2220	B
9	2008CA-Bmu-04176	2008-08-02 10:50:19.000	-119.3380	31.2270	1
10	2008CA-Bmu-04176	2008-08-02 13:28:52.000	-119.3360	31.2550	1
11	2008CA-Bmu-04176	2008-08-03 00:54:28.000	-119.1410	31.3110	0
12	2008CA-Bmu-04176	2008-08-03 10:39:27.000	-119.0370	31.3630	A
13	2008CA-Bmu-04176	2008-08-03 13:18:47.000	-118.9730	31.3520	1
14	2008CA-Bmu-04176	2008-08-03 13:55:42.000	-118.9720	31.3250	A
15	2008CA-Bmu-04176	2008-08-03 21:59:34.000	-119.0060	31.3890	A
16	2008CA-Bmu-04176	2008-08-04 10:28:45.000	-119.1730	31.2570	2
17	2008CA-Bmu-04176	2008-08-04 13:05:09.000	-119.0720	31.3440	1
18	2008CA-Bmu-04176	2008-08-04 21:52:23.000	-119.0980	31.5560	0
19	2008CA-Bmu-04176	2008-08-05 00:28:43.000	-119.2520	31.7170	1
20	2008CA-Bmu-04176	2008-08-05 10:19:34.000	-119.2350	31.9560	0
21	2008CA-Bmu-04176	2008-08-05 13:06:19.000	-119.2520	31.9990	0

	ID	timestamp	longitude	latitude	sensorQuality
22	2008CA-Bmu-04176	2008-08-05 21:37:46.000	-119.2030	31.8710	0
23	2008CA-Bmu-04176	2008-08-06 00:19:13.000	-119.1360	31.8750	0
24	2008CA-Bmu-04176	2008-08-06 00:24:17.000	-119.0010	31.8320	B
25	2008CA-Bmu-04176	2008-08-06 10:10:14.000	-118.8020	31.7560	1
26	2008CA-Bmu-04176	2008-08-07 00:02:53.000	-118.4630	31.9410	B
27	2008CA-Bmu-04176	2008-08-07 00:05:17.000	-118.4840	31.8690	1
28	2008CA-Bmu-04176	2008-08-07 21:19:35.000	-118.4670	32.0740	1
29	2008CA-Bmu-04176	2008-08-08 13:57:53.000	-118.4310	32.1430	A
30	2008CA-Bmu-04176	2008-08-09 00:50:26.000	-118.4070	32.0680	2
31	2008CA-Bmu-04176	2008-08-09 13:10:43.000	-118.3980	32.1160	0
32	2008CA-Bmu-04176	2008-08-09 13:47:12.000	-118.4170	32.1300	0
33	2008CA-Bmu-04176	2008-08-10 00:28:59.000	-118.7140	32.2030	0
34	2008CA-Bmu-04176	2008-08-10 13:36:48.000	-118.5200	32.5090	1
35	2008CA-Bmu-04176	2008-08-11 00:05:06.000	-118.3540	32.4750	B
36	2008CA-Bmu-04176	2008-08-11 00:58:46.000	-118.3350	32.4700	0
37	2008CA-Bmu-04176	2008-08-11 10:56:54.000	-118.2620	32.5060	A
38	2008CA-Bmu-04176	2008-08-11 13:22:36.000	-118.2740	32.5350	2
39	2008CA-Bmu-04176	2008-08-11 14:03:12.000	-118.3060	32.5480	B
40	2008CA-Bmu-04176	2008-08-12 00:46:35.000	-118.0130	32.5410	A
41	2008CA-Bmu-04176	2008-08-12 10:47:32.000	-118.2550	32.5640	1
42	2008CA-Bmu-04176	2008-08-13 00:31:35.000	-118.1720	32.6870	1

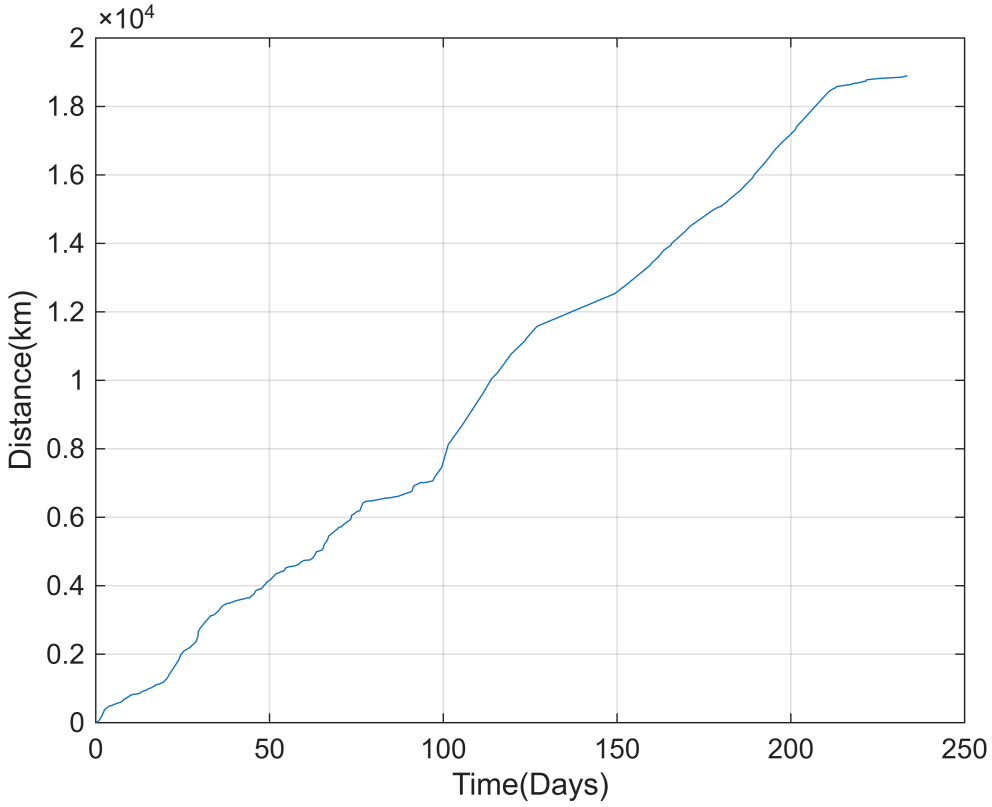
	ID	timestamp	longitude	latitude	sensorQuality
43	2008CA-Bmu-04176	2008-08-13 00:55:46.000	-118.1420	32.6660	A
44	2008CA-Bmu-04176	2008-08-13 10:34:25.000	-118.3770	32.6290	2
45	2008CA-Bmu-04176	2008-08-13 13:05:45.000	-118.2700	32.5770	B
46	2008CA-Bmu-04176	2008-08-14 00:23:27.000	-118.3830	32.7110	0
47	2008CA-Bmu-04176	2008-08-14 00:31:33.000	-118.4950	32.6820	0
48	2008CA-Bmu-04176	2008-08-14 10:23:47.000	-118.2660	32.7770	1
49	2008CA-Bmu-04176	2008-08-14 21:47:40.000	-118.2700	32.8660	1
50	2008CA-Bmu-04176	2008-08-15 00:09:31.000	-118.2620	32.8580	2
51	2008CA-Bmu-04176	2008-08-15 00:10:09.000	-118.2860	32.8590	1
52	2008CA-Bmu-04176	2008-08-15 10:16:13.000	-118.2930	32.7620	1
53	2008CA-Bmu-04176	2008-08-15 21:35:34.000	-117.9960	32.7600	1
54	2008CA-Bmu-04176	2008-08-16 10:06:42.000	-117.8970	32.5900	A
55	2008CA-Bmu-04176	2008-08-16 13:46:32.000	-117.9440	32.6640	A
56	2008CA-Bmu-04176	2008-08-16 21:22:50.000	-117.9060	32.3420	0
57	2008CA-Bmu-04176	2008-08-17 01:02:33.000	-118.0540	32.3220	0
58	2008CA-Bmu-04176	2008-08-17 13:19:28.000	-118.6580	32.3100	0
59	2008CA-Bmu-04176	2008-08-17 13:53:13.000	-118.5710	32.3220	0
60	2008CA-Bmu-04176	2008-08-17 21:13:30.000	-118.8610	32.5730	0
61	2008CA-Bmu-04176	2008-08-18 00:35:27.000	-119.2700	32.6460	A
62	2008CA-Bmu-04176	2008-08-18 13:43:59.000	-120.0210	33.0510	1
63	2008CA-Bmu-04176	2008-08-20 11:02:23.000	-122.3600	34.8790	B

	ID	timestamp	longitude	latitude	sensorQuality
64	2008CA-Bmu-04176	2008-08-20 13:18:50.000	-122.3410	35.0050	A
65	2008CA-Bmu-04176	2008-08-20 13:45:20.000	-122.3200	35.0290	0
66	2008CA-Bmu-04176	2008-08-21 00:43:53.000	-123.0780	35.2640	0
67	2008CA-Bmu-04176	2008-08-21 10:50:58.000	-121.9950	35.9290	2
68	2008CA-Bmu-04176	2008-08-21 13:23:46.000	-121.9130	36.0460	1
69	2008CA-Bmu-04176	2008-08-22 00:31:47.000	-121.9860	36.4940	0
70	2008CA-Bmu-04176	2008-08-22 00:43:54.000	-122.0650	36.5060	B
71	2008CA-Bmu-04176	2008-08-22 10:39:43.000	-122.1000	36.9220	0
72	2008CA-Bmu-04176	2008-08-23 21:54:10.000	-122.8860	37.4380	2
73	2008CA-Bmu-04176	2008-08-24 00:09:45.000	-122.9170	37.4560	0
74	2008CA-Bmu-04176	2008-08-24 10:17:52.000	-122.5900	37.4500	0
75	2008CA-Bmu-04176	2008-08-24 13:53:02.000	-122.9080	37.4880	1
76	2008CA-Bmu-04176	2008-08-24 21:46:31.000	-123.0320	37.6400	1
77	2008CA-Bmu-04176	2008-08-25 13:27:39.000	-123.1090	38.2010	B
78	2008CA-Bmu-04176	2008-08-25 14:00:37.000	-123.1710	38.2560	0
79	2008CA-Bmu-04176	2008-08-25 21:35:56.000	-123.2350	38.5190	0
80	2008CA-Bmu-04176	2008-08-26 10:02:33.000	-124.7360	39.0200	B
81	2008CA-Bmu-04176	2008-08-26 13:05:32.000	-123.4580	38.1710	2
82	2008CA-Bmu-04176	2008-08-27 00:22:25.000	-123.1030	37.3400	0
83	2008CA-Bmu-04176	2008-08-29 11:04:29.000	-121.1770	35.1520	B
84	2008CA-Bmu-04176	2008-08-29 13:11:19.000	-121.3060	35.1840	0

	ID	timestamp	longitude	latitude	sensorQuality
85	2008CA-Bmu-04176	2008-08-30 00:34:06.000	-121.3290	34.7580	A
86	2008CA-Bmu-04176	2008-08-30 00:50:35.000	-121.2070	34.7610	0
87	2008CA-Bmu-04176	2008-08-30 11:03:09.000	-121.2630	34.8000	0
88	2008CA-Bmu-04176	2008-08-30 13:08:24.000	-121.2610	34.7870	1
89	2008CA-Bmu-04176	2008-08-31 00:28:06.000	-121.4440	34.7170	A
90	2008CA-Bmu-04176	2008-08-31 10:49:50.000	-121.0870	34.5940	1
91	2008CA-Bmu-04176	2008-09-01 10:38:38.000	-120.4850	33.9610	A
92	2008CA-Bmu-04176	2008-09-01 21:59:03.000	-120.1990	33.3780	1
93	2008CA-Bmu-04176	2008-09-02 10:27:11.000	-120.1030	32.8510	1
94	2008CA-Bmu-04176	2008-09-02 21:50:12.000	-119.9350	32.6060	<undefined>
95	2008CA-Bmu-04176	2008-09-03 00:53:39.000	-119.8160	32.5800	1
96	2008CA-Bmu-04176	2008-09-03 10:15:30.000	-119.6490	32.5020	0
97	2008CA-Bmu-04176	2008-09-03 13:15:30.000	-119.7150	32.4990	0
98	2008CA-Bmu-04176	2008-09-03 13:54:06.000	-119.6790	32.4770	B
99	2008CA-Bmu-04176	2008-09-03 21:41:49.000	-119.5870	32.5140	0
100	2008CA-Bmu-04176	2008-09-04 13:42:29.000	-119.5710	32.4800	0

⋮

```
plot(whale.elapsedDays,whale.distance)
xlabel("Time(Days)")
ylabel("Distance(km)")
grid on
```



Apply Linear Fit

Determine the coefficients of a linear equation that best fits the whale data. The slope of the line corresponds to the whale's distance travelled per day.

```
p = polyfit(whale.elapsedDays,whale.distance,1)
```

```
p = 1×2
   85.3869 -158.9529
```

```
kmPerDay = p(1)
```

```
kmPerDay =
85.3869
```

```
whale.predictedDistance = polyval(p,whale.elapsedDays)
```

```
whale = 259×11 table
```

...

	ID	timestamp	longitude	latitude	sensorQuality
1	2008CA-Bmu-04176	2008-07-28 00:40:25.000	-120.0440	34.1340	0

	ID	timestamp	longitude	latitude	sensorQuality
2	2008CA-Bmu-04176	2008-07-28 21:24:11.000	-120.6060	34.1150	0
3	2008CA-Bmu-04176	2008-07-29 21:11:49.000	-119.1460	33.2770	A
4	2008CA-Bmu-04176	2008-07-30 13:52:54.000	-120.0030	31.9730	B
5	2008CA-Bmu-04176	2008-08-01 00:43:05.000	-119.2100	31.2420	0
6	2008CA-Bmu-04176	2008-08-01 13:45:07.000	-119.2250	31.2030	0
7	2008CA-Bmu-04176	2008-08-02 00:15:53.000	-119.3980	31.2690	B
8	2008CA-Bmu-04176	2008-08-02 01:01:38.000	-119.2560	31.2220	B
9	2008CA-Bmu-04176	2008-08-02 10:50:19.000	-119.3380	31.2270	1
10	2008CA-Bmu-04176	2008-08-02 13:28:52.000	-119.3360	31.2550	1
11	2008CA-Bmu-04176	2008-08-03 00:54:28.000	-119.1410	31.3110	0
12	2008CA-Bmu-04176	2008-08-03 10:39:27.000	-119.0370	31.3630	A
13	2008CA-Bmu-04176	2008-08-03 13:18:47.000	-118.9730	31.3520	1
14	2008CA-Bmu-04176	2008-08-03 13:55:42.000	-118.9720	31.3250	A
15	2008CA-Bmu-04176	2008-08-03 21:59:34.000	-119.0060	31.3890	A
16	2008CA-Bmu-04176	2008-08-04 10:28:45.000	-119.1730	31.2570	2
17	2008CA-Bmu-04176	2008-08-04 13:05:09.000	-119.0720	31.3440	1
18	2008CA-Bmu-04176	2008-08-04 21:52:23.000	-119.0980	31.5560	0
19	2008CA-Bmu-04176	2008-08-05 00:28:43.000	-119.2520	31.7170	1
20	2008CA-Bmu-04176	2008-08-05 10:19:34.000	-119.2350	31.9560	0
21	2008CA-Bmu-04176	2008-08-05 13:06:19.000	-119.2520	31.9990	0
22	2008CA-Bmu-04176	2008-08-05 21:37:46.000	-119.2030	31.8710	0

	ID	timestamp	longitude	latitude	sensorQuality
23	2008CA-Bmu-04176	2008-08-06 00:19:13.000	-119.1360	31.8750	0
24	2008CA-Bmu-04176	2008-08-06 00:24:17.000	-119.0010	31.8320	B
25	2008CA-Bmu-04176	2008-08-06 10:10:14.000	-118.8020	31.7560	1
26	2008CA-Bmu-04176	2008-08-07 00:02:53.000	-118.4630	31.9410	B
27	2008CA-Bmu-04176	2008-08-07 00:05:17.000	-118.4840	31.8690	1
28	2008CA-Bmu-04176	2008-08-07 21:19:35.000	-118.4670	32.0740	1
29	2008CA-Bmu-04176	2008-08-08 13:57:53.000	-118.4310	32.1430	A
30	2008CA-Bmu-04176	2008-08-09 00:50:26.000	-118.4070	32.0680	2
31	2008CA-Bmu-04176	2008-08-09 13:10:43.000	-118.3980	32.1160	0
32	2008CA-Bmu-04176	2008-08-09 13:47:12.000	-118.4170	32.1300	0
33	2008CA-Bmu-04176	2008-08-10 00:28:59.000	-118.7140	32.2030	0
34	2008CA-Bmu-04176	2008-08-10 13:36:48.000	-118.5200	32.5090	1
35	2008CA-Bmu-04176	2008-08-11 00:05:06.000	-118.3540	32.4750	B
36	2008CA-Bmu-04176	2008-08-11 00:58:46.000	-118.3350	32.4700	0
37	2008CA-Bmu-04176	2008-08-11 10:56:54.000	-118.2620	32.5060	A
38	2008CA-Bmu-04176	2008-08-11 13:22:36.000	-118.2740	32.5350	2
39	2008CA-Bmu-04176	2008-08-11 14:03:12.000	-118.3060	32.5480	B
40	2008CA-Bmu-04176	2008-08-12 00:46:35.000	-118.0130	32.5410	A
41	2008CA-Bmu-04176	2008-08-12 10:47:32.000	-118.2550	32.5640	1
42	2008CA-Bmu-04176	2008-08-13 00:31:35.000	-118.1720	32.6870	1
43	2008CA-Bmu-04176	2008-08-13 00:55:46.000	-118.1420	32.6660	A

	ID	timestamp	longitude	latitude	sensorQuality
44	2008CA-Bmu-04176	2008-08-13 10:34:25.000	-118.3770	32.6290	2
45	2008CA-Bmu-04176	2008-08-13 13:05:45.000	-118.2700	32.5770	B
46	2008CA-Bmu-04176	2008-08-14 00:23:27.000	-118.3830	32.7110	0
47	2008CA-Bmu-04176	2008-08-14 00:31:33.000	-118.4950	32.6820	0
48	2008CA-Bmu-04176	2008-08-14 10:23:47.000	-118.2660	32.7770	1
49	2008CA-Bmu-04176	2008-08-14 21:47:40.000	-118.2700	32.8660	1
50	2008CA-Bmu-04176	2008-08-15 00:09:31.000	-118.2620	32.8580	2
51	2008CA-Bmu-04176	2008-08-15 00:10:09.000	-118.2860	32.8590	1
52	2008CA-Bmu-04176	2008-08-15 10:16:13.000	-118.2930	32.7620	1
53	2008CA-Bmu-04176	2008-08-15 21:35:34.000	-117.9960	32.7600	1
54	2008CA-Bmu-04176	2008-08-16 10:06:42.000	-117.8970	32.5900	A
55	2008CA-Bmu-04176	2008-08-16 13:46:32.000	-117.9440	32.6640	A
56	2008CA-Bmu-04176	2008-08-16 21:22:50.000	-117.9060	32.3420	0
57	2008CA-Bmu-04176	2008-08-17 01:02:33.000	-118.0540	32.3220	0
58	2008CA-Bmu-04176	2008-08-17 13:19:28.000	-118.6580	32.3100	0
59	2008CA-Bmu-04176	2008-08-17 13:53:13.000	-118.5710	32.3220	0
60	2008CA-Bmu-04176	2008-08-17 21:13:30.000	-118.8610	32.5730	0
61	2008CA-Bmu-04176	2008-08-18 00:35:27.000	-119.2700	32.6460	A
62	2008CA-Bmu-04176	2008-08-18 13:43:59.000	-120.0210	33.0510	1
63	2008CA-Bmu-04176	2008-08-20 11:02:23.000	-122.3600	34.8790	B
64	2008CA-Bmu-04176	2008-08-20 13:18:50.000	-122.3410	35.0050	A

	ID	timestamp	longitude	latitude	sensorQuality
65	2008CA-Bmu-04176	2008-08-20 13:45:20.000	-122.3200	35.0290	0
66	2008CA-Bmu-04176	2008-08-21 00:43:53.000	-123.0780	35.2640	0
67	2008CA-Bmu-04176	2008-08-21 10:50:58.000	-121.9950	35.9290	2
68	2008CA-Bmu-04176	2008-08-21 13:23:46.000	-121.9130	36.0460	1
69	2008CA-Bmu-04176	2008-08-22 00:31:47.000	-121.9860	36.4940	0
70	2008CA-Bmu-04176	2008-08-22 00:43:54.000	-122.0650	36.5060	B
71	2008CA-Bmu-04176	2008-08-22 10:39:43.000	-122.1000	36.9220	0
72	2008CA-Bmu-04176	2008-08-23 21:54:10.000	-122.8860	37.4380	2
73	2008CA-Bmu-04176	2008-08-24 00:09:45.000	-122.9170	37.4560	0
74	2008CA-Bmu-04176	2008-08-24 10:17:52.000	-122.5900	37.4500	0
75	2008CA-Bmu-04176	2008-08-24 13:53:02.000	-122.9080	37.4880	1
76	2008CA-Bmu-04176	2008-08-24 21:46:31.000	-123.0320	37.6400	1
77	2008CA-Bmu-04176	2008-08-25 13:27:39.000	-123.1090	38.2010	B
78	2008CA-Bmu-04176	2008-08-25 14:00:37.000	-123.1710	38.2560	0
79	2008CA-Bmu-04176	2008-08-25 21:35:56.000	-123.2350	38.5190	0
80	2008CA-Bmu-04176	2008-08-26 10:02:33.000	-124.7360	39.0200	B
81	2008CA-Bmu-04176	2008-08-26 13:05:32.000	-123.4580	38.1710	2
82	2008CA-Bmu-04176	2008-08-27 00:22:25.000	-123.1030	37.3400	0
83	2008CA-Bmu-04176	2008-08-29 11:04:29.000	-121.1770	35.1520	B
84	2008CA-Bmu-04176	2008-08-29 13:11:19.000	-121.3060	35.1840	0
85	2008CA-Bmu-04176	2008-08-30 00:34:06.000	-121.3290	34.7580	A

	ID	timestamp	longitude	latitude	sensorQuality
86	2008CA-Bmu-04176	2008-08-30 00:50:35.000	-121.2070	34.7610	0
87	2008CA-Bmu-04176	2008-08-30 11:03:09.000	-121.2630	34.8000	0
88	2008CA-Bmu-04176	2008-08-30 13:08:24.000	-121.2610	34.7870	1
89	2008CA-Bmu-04176	2008-08-31 00:28:06.000	-121.4440	34.7170	A
90	2008CA-Bmu-04176	2008-08-31 10:49:50.000	-121.0870	34.5940	1
91	2008CA-Bmu-04176	2008-09-01 10:38:38.000	-120.4850	33.9610	A
92	2008CA-Bmu-04176	2008-09-01 21:59:03.000	-120.1990	33.3780	1
93	2008CA-Bmu-04176	2008-09-02 10:27:11.000	-120.1030	32.8510	1
94	2008CA-Bmu-04176	2008-09-02 21:50:12.000	-119.9350	32.6060	<undefined>
95	2008CA-Bmu-04176	2008-09-03 00:53:39.000	-119.8160	32.5800	1
96	2008CA-Bmu-04176	2008-09-03 10:15:30.000	-119.6490	32.5020	0
97	2008CA-Bmu-04176	2008-09-03 13:15:30.000	-119.7150	32.4990	0
98	2008CA-Bmu-04176	2008-09-03 13:54:06.000	-119.6790	32.4770	B
99	2008CA-Bmu-04176	2008-09-03 21:41:49.000	-119.5870	32.5140	0
100	2008CA-Bmu-04176	2008-09-04 13:42:29.000	-119.5710	32.4800	0

⋮

Visualize Linear Fit

Create a plot using the measured data with the fit.

```
% Plot travel distance versus days
plot(whale.elapsedDays,whale.distance,"Color","r","Marker",".",...
    "Linestyle","none")
grid on

% Plot the fit on top of the measured data
hold on
```

```
plot(whale.elapsedDays,whale.predictedDistance,"Color","b",...
    "Linestyle",":","LineWidth",2)
hold off

% Set the y-axis limits
ylim([0,2e4])

% Add a legend, title and labels
legend("Measurements","Prediction","Location","northwest")
title("Whale Average Speed = " + kmPerDay + "km/day")
xlabel("Time(Days)")
ylabel("Distance(km)")

xlim([39.1 130.8])
ylim([3503 12458])
```