March 25, 2004 Sierra Wave XC

Flight Review

Kempton Izuno

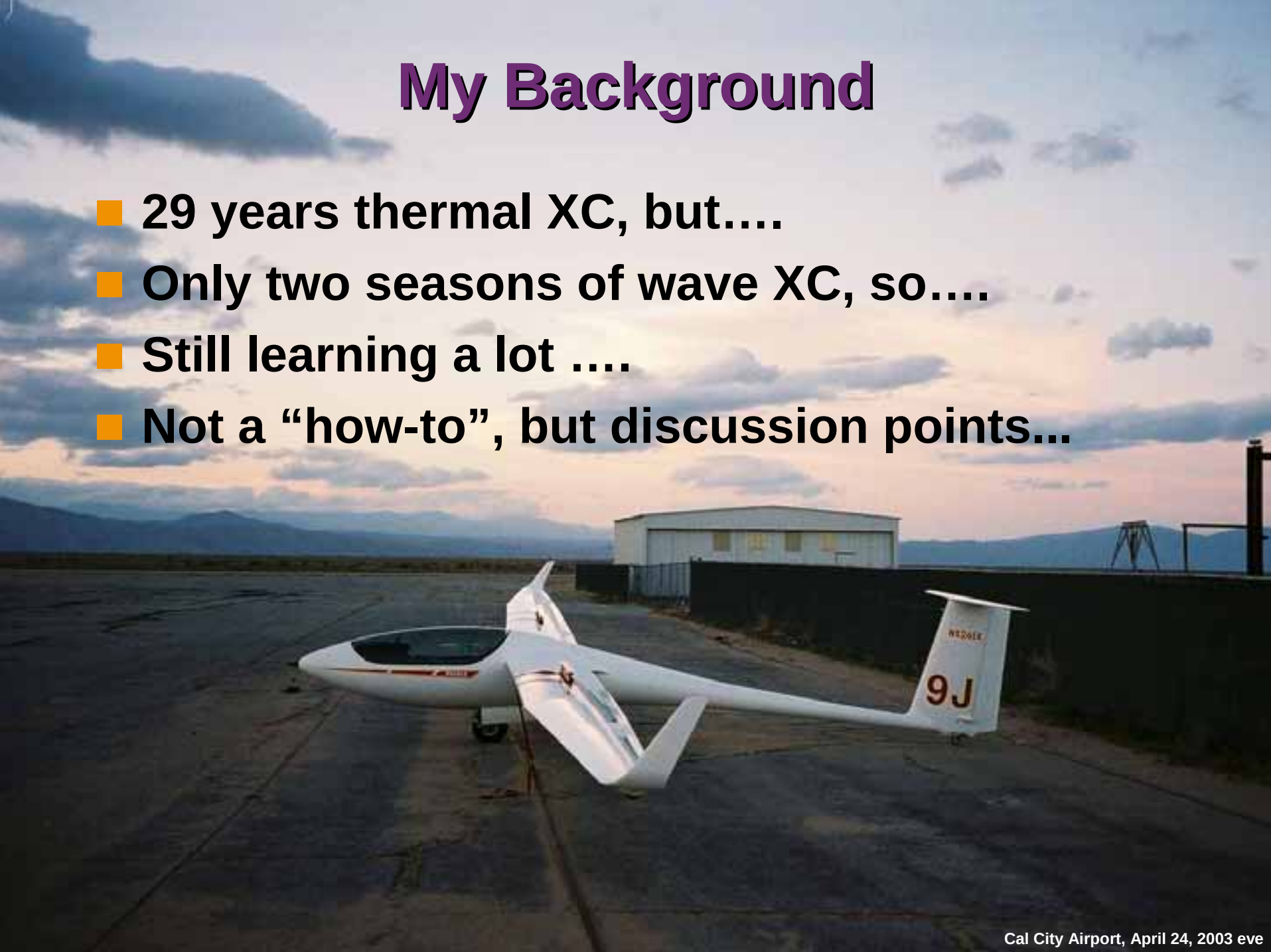
November 6, 2004

All images by author unless otherwise noted.

View North on first leg, Carson Valley

My Background

- 29 years thermal XC, but….
- Only two seasons of wave XC, so….
- Still learning a lot ….
- Not a “how-to”, but discussion points...



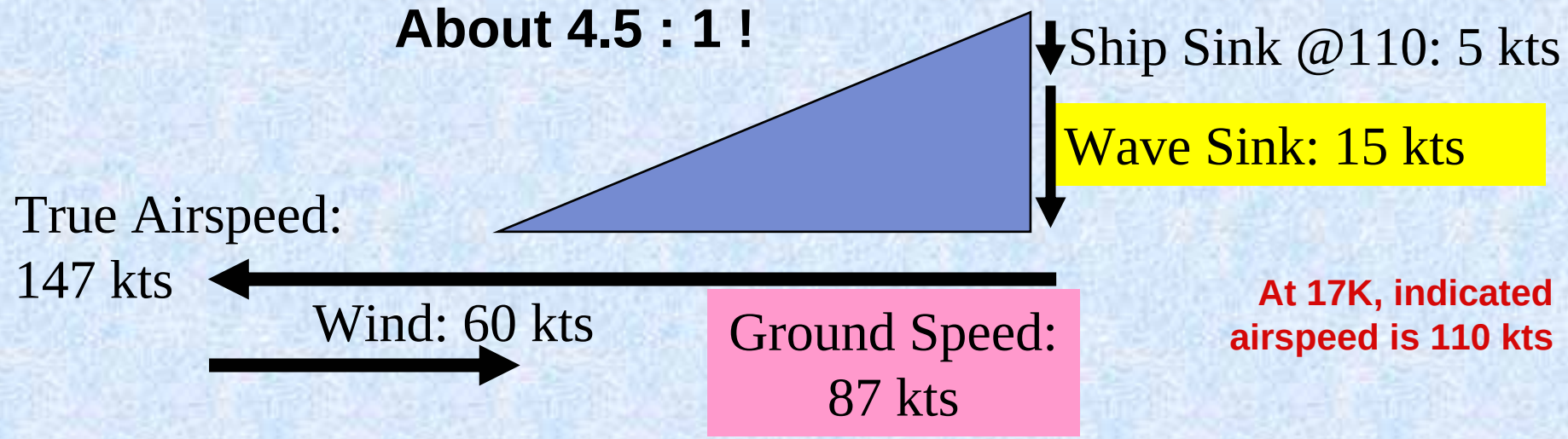
Cal City Airport, April 24, 2003 eve

HIGHER RISK FLYING

- **Length of Flight**
- **Cold**
- **Oxygen: Capacity, EDS, √ regulator**
- **Wind**
  - Sink (downwind to save…most times)
  - Turbulence (upset)
- **Closed window below (“One Way ticket”)**
- **White out (lennie edge or snow)**
- **Bailing Out**
- **“Small Corridor” Situation**

Wave scud near Bridgeport, October 18, 2004

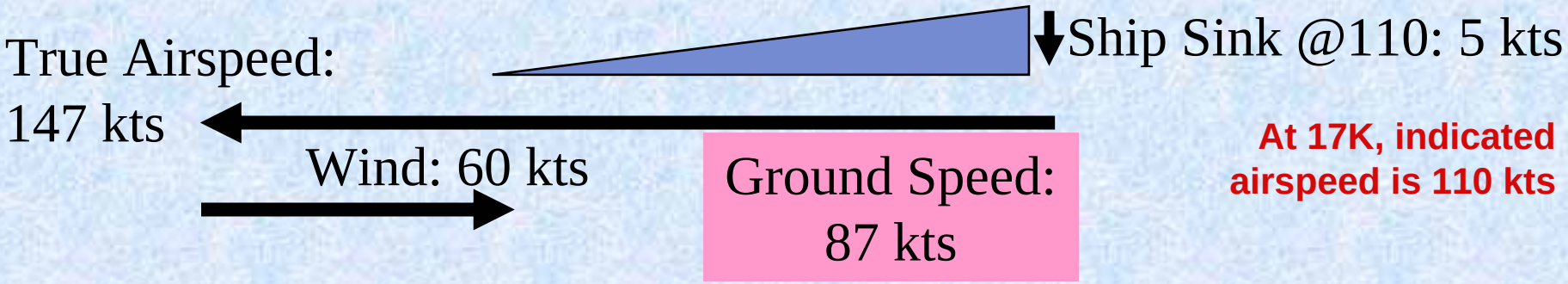
Glide Triangle Upwind (1)



- **Moving upwind to the next wave…**
- **Even with a 20:1 glide at 110 kts…**
- **With a 60 kt headwind…**
- **And 15 kt sink…**
- **= 4.5 : 1 glide!**
- **18K to 10K and only cover 6 nm**

Glide Triangle Upwind (2)

About 17 : 1 !



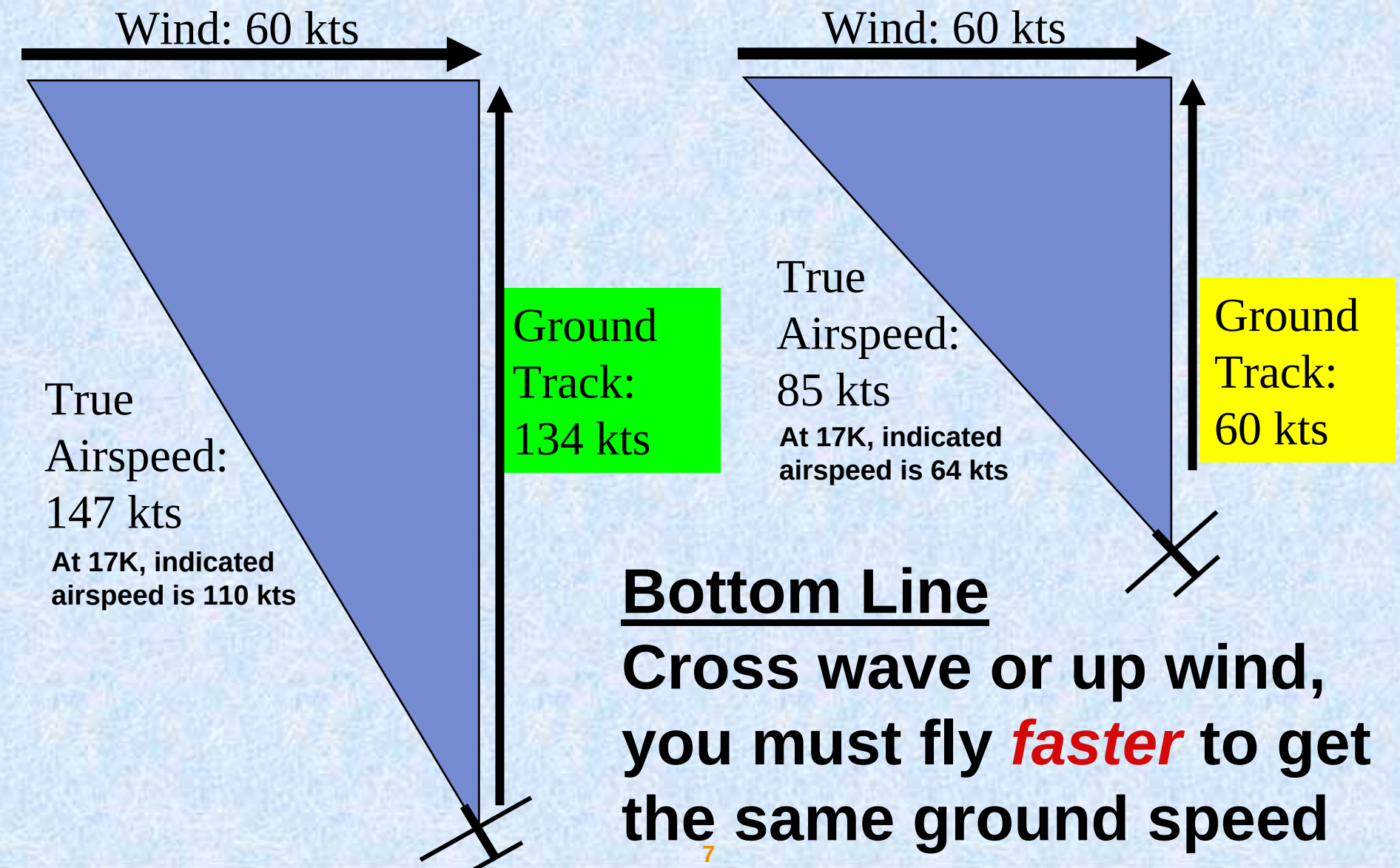
- **Moving upwind to the next wave…**
- **Even with a 20:1 glide at 110 kts…**
- **With a 60 kt headwind…**
- **= 17 : 1 glide!**
- **18K to 10K and only cover 22 nm**
- **See handout**

Rules #1 & #2

Upwind moves are expensive, thus...

1) **You're always 10 minutes away from landing, and…**
2) **Transition upwind BETWEEN lenticulars**

The Wind Triangle



Bottom Line

Cross wave or up wind, you must fly *faster* to get the same ground speed

Rule #3

Fly at least Rough Air redline, all the time!

OR, in other words…

Fly >80 knots unless you are low

Bumping under the 18K ceiling

- <Vne accounting for altitude
- Vario ave = 0
- 17.6K target

Ship Type

- Best: Flat Glide at High Speed
- Heavy: Two seater or Engine
- Flapped 15M ok

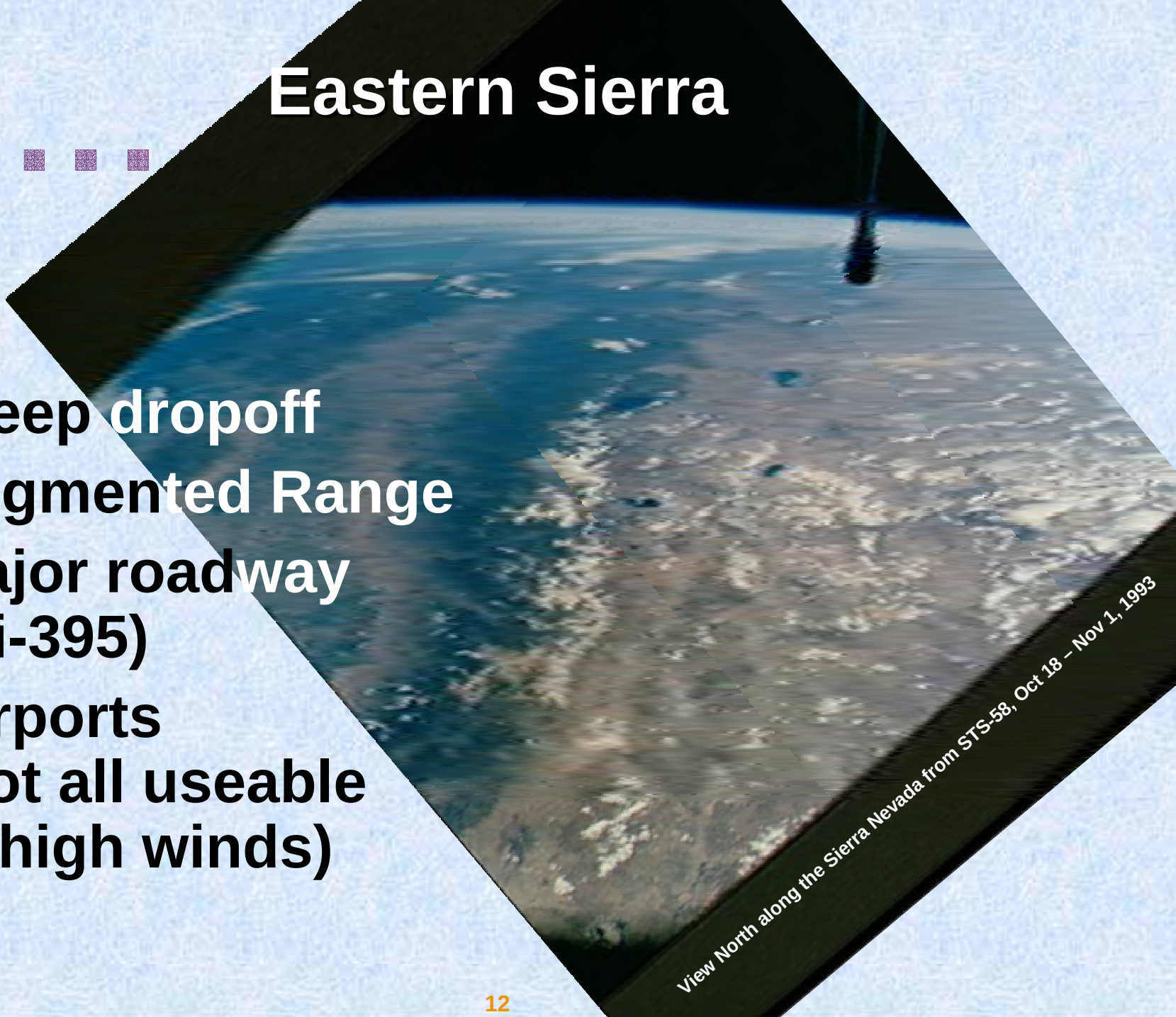
Jean-Marie Clement and his Nimbus 4DM, 2003 Expedition to Patagonia. Image courtesy Fabrice Papazian.

Agenda

- Sierra Nevada Wave
- Flight Weather
- Flight Events
- More Thoughts

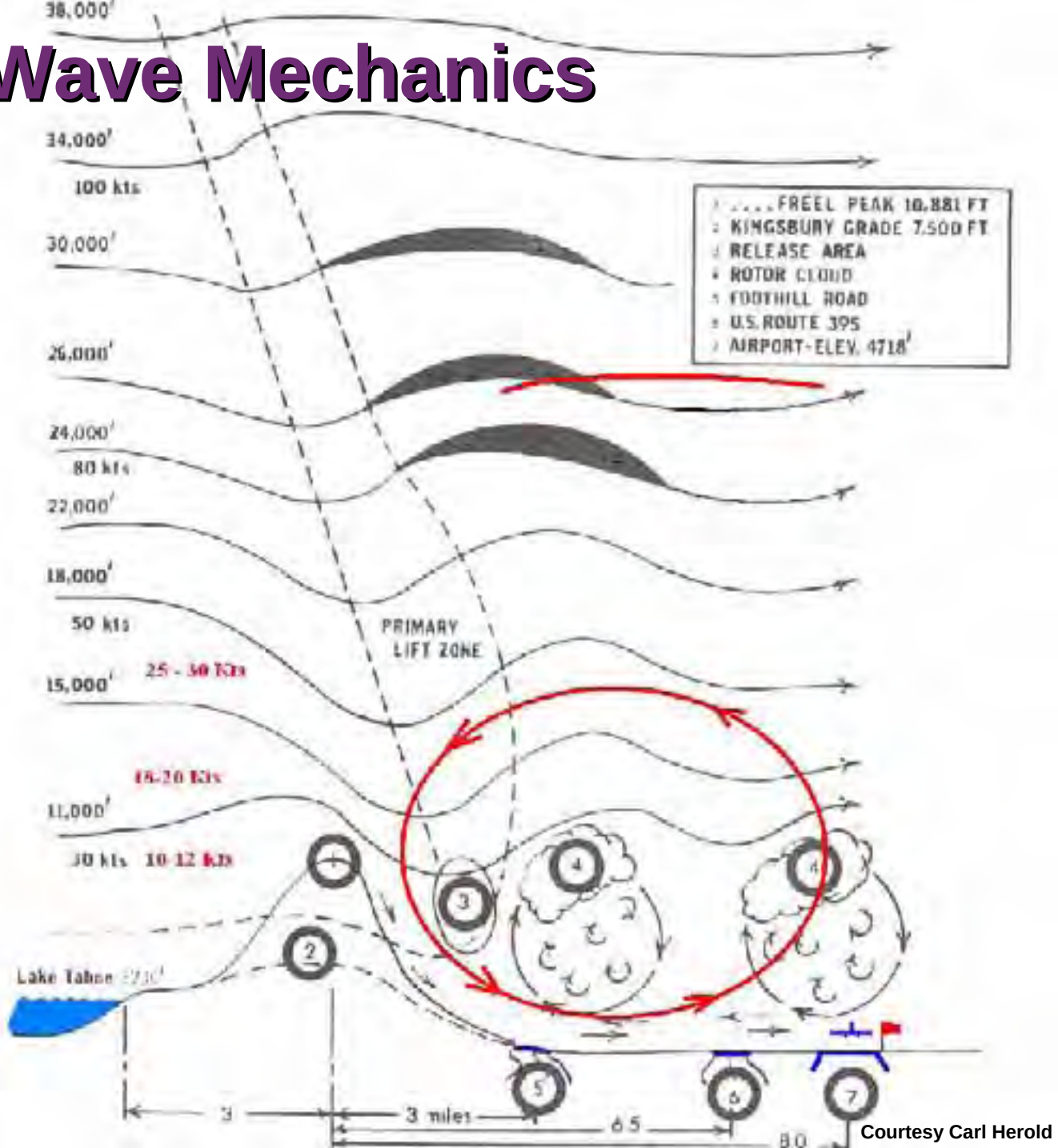
Eastern Sierra

- Steep dropoff
- Segmented Range
- Major roadway (Hi-395)
- Airports (not all useable in high winds)



Wave Mechanics

3 Factors control wave:
- **Air Stability**
- **Wind Speed**
- **Terrain**



Courtesy Carl Herold

The Season

- **Prime Time: early March – late April**
  - <March: Days shorter and colder
  - >April: Air less stable so lower quality wave
- **Usually only one great day, then rain**
- **Lift to 50K+ but …**
- **Class A @ 18K**

Minden Wave, view NE. Image courtesy Eric Greenwell.

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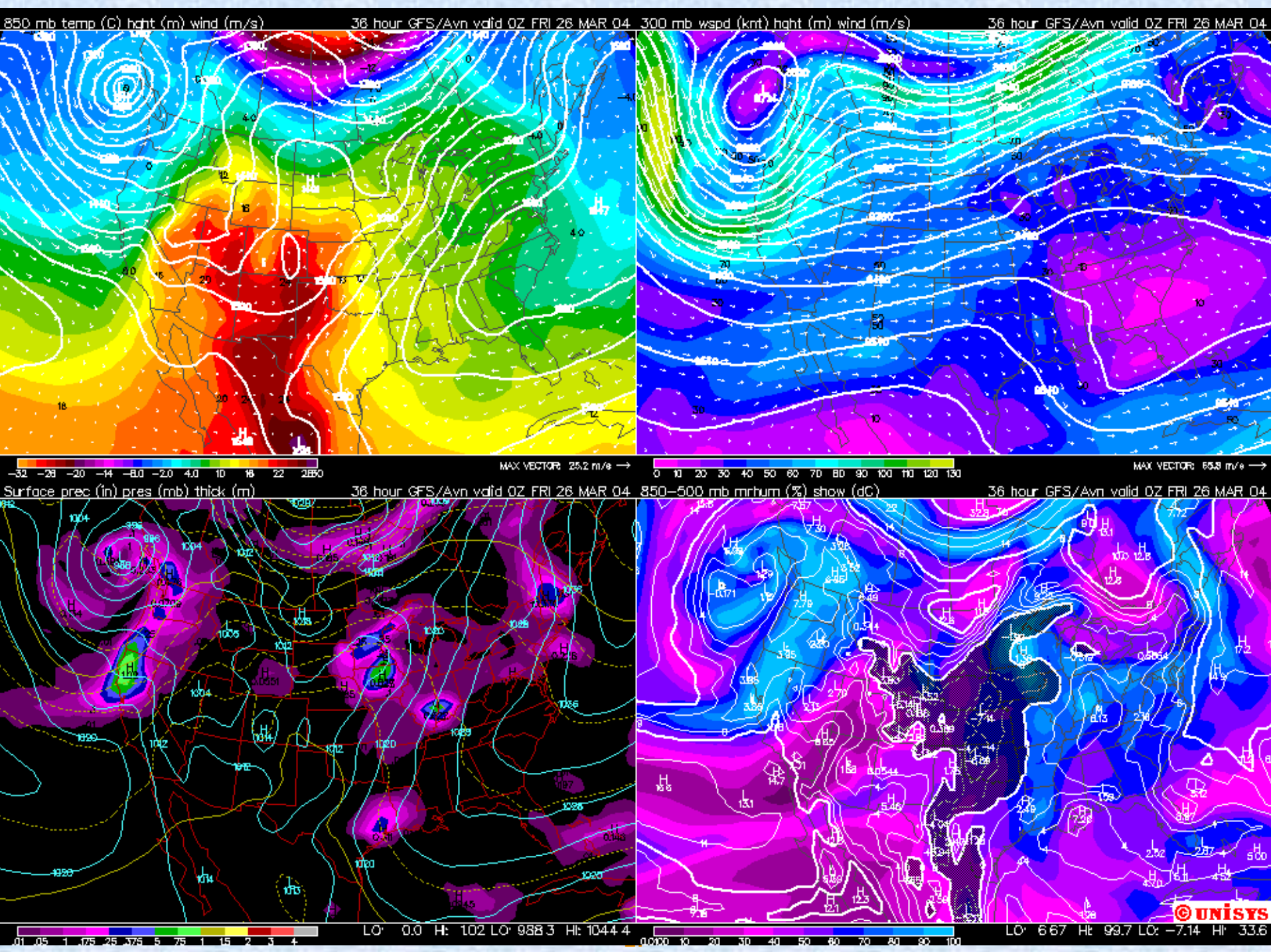
Systemic Sierra XC Wave

- Uniform wind, moisture, direction
- Clear air
- 50-70% RH for plentiful markers
- <0.01 – 0.05” precip
- 300mb: 70-90 knots
- 500mb: 50-60 knots
- 700mb: 25-30 knots
- Usually a one day event


850 mb temp (C) hght (m) wind (m/s)
36 hour GFS/Avn valid 0Z FRI 26 MAR 04
300 mb wspd (knt) hght (m) wind (m/s)
36 hour GFS/Avn valid 0Z FRI 26 MAR 04
MAX VECTOR: 25.2 m/s
MAX VECTOR: 65.8 m/s
Surface prec (in) pres (mb) thick (m)
36 hour GFS/Avn valid 0Z FRI 26 MAR 04
850-500 mb mrhum (%) show (dC)
36 hour GFS/Avn valid 0Z FRI 26 MAR 04
LO: 0.0 HI: 102 LO: 988.3 HI: 1044.4
LO: 6.67 HI: 99.7 LO: -7.14 HI: 33.6
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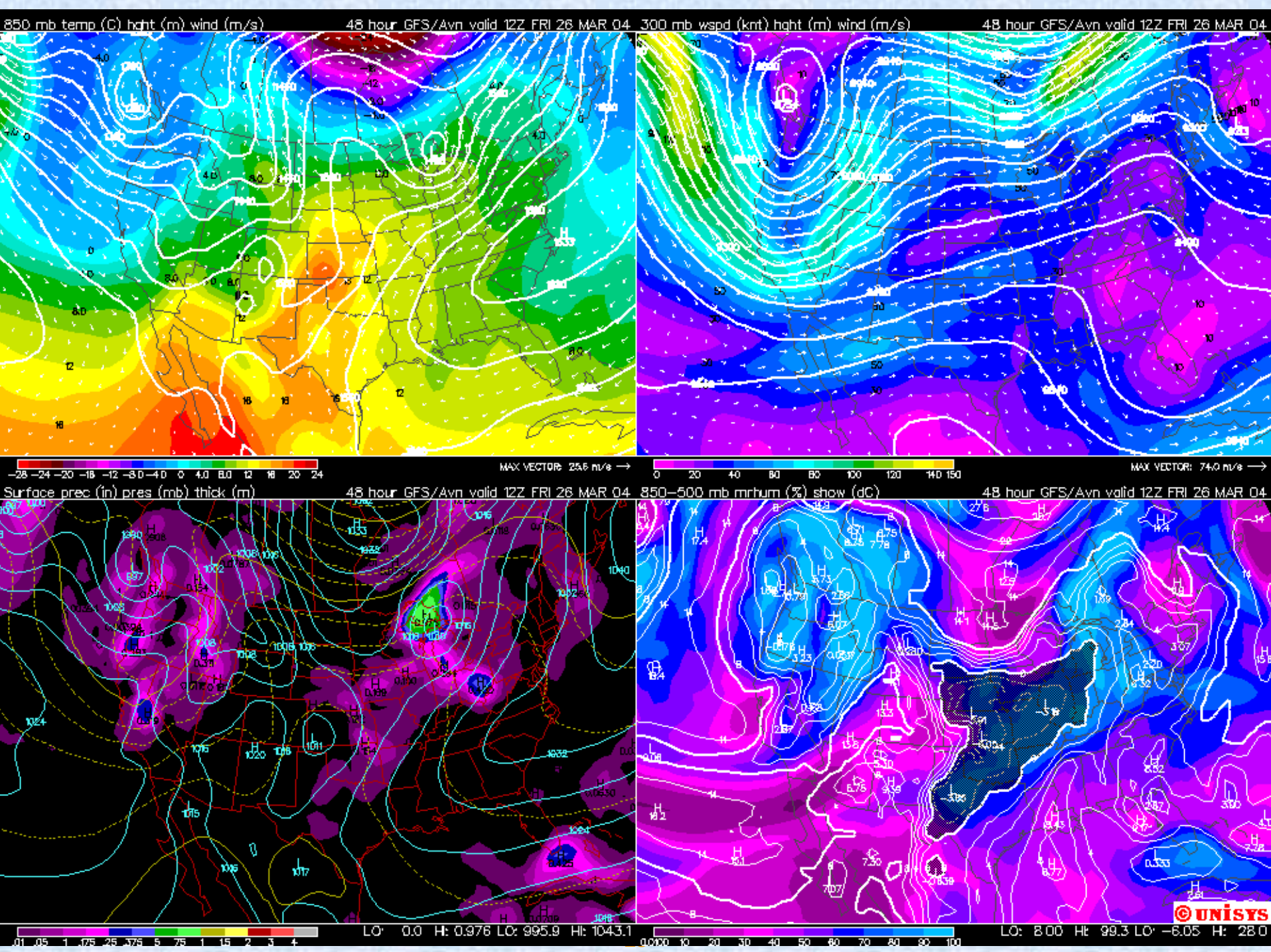
850 mb temp (C) hght (m) wind (m/s)
48 hour GFS/Avn valid 12Z FRI 26 MAR 04
300 mb wspd (knt) hght (m) wind (m/s)
48 hour GFS/Avn valid 12Z FRI 26 MAR 04
MAX VECTOR: 25.6 m/s
MAX VECTOR: 74.0 m/s
Surface prec (in) pres (mb) thick (m)
48 hour GFS/Avn valid 12Z FRI 26 MAR 04
850-500 mb mrhum (%) show (dC)
48 hour GFS/Avn valid 12Z FRI 26 MAR 04
LO: 0.0 HI: 0.976 LO: 995.9 HI: 1043.1
LO: 8.00 HI: 99.3 LO: -6.05 HI: 28.0
©UNISYS

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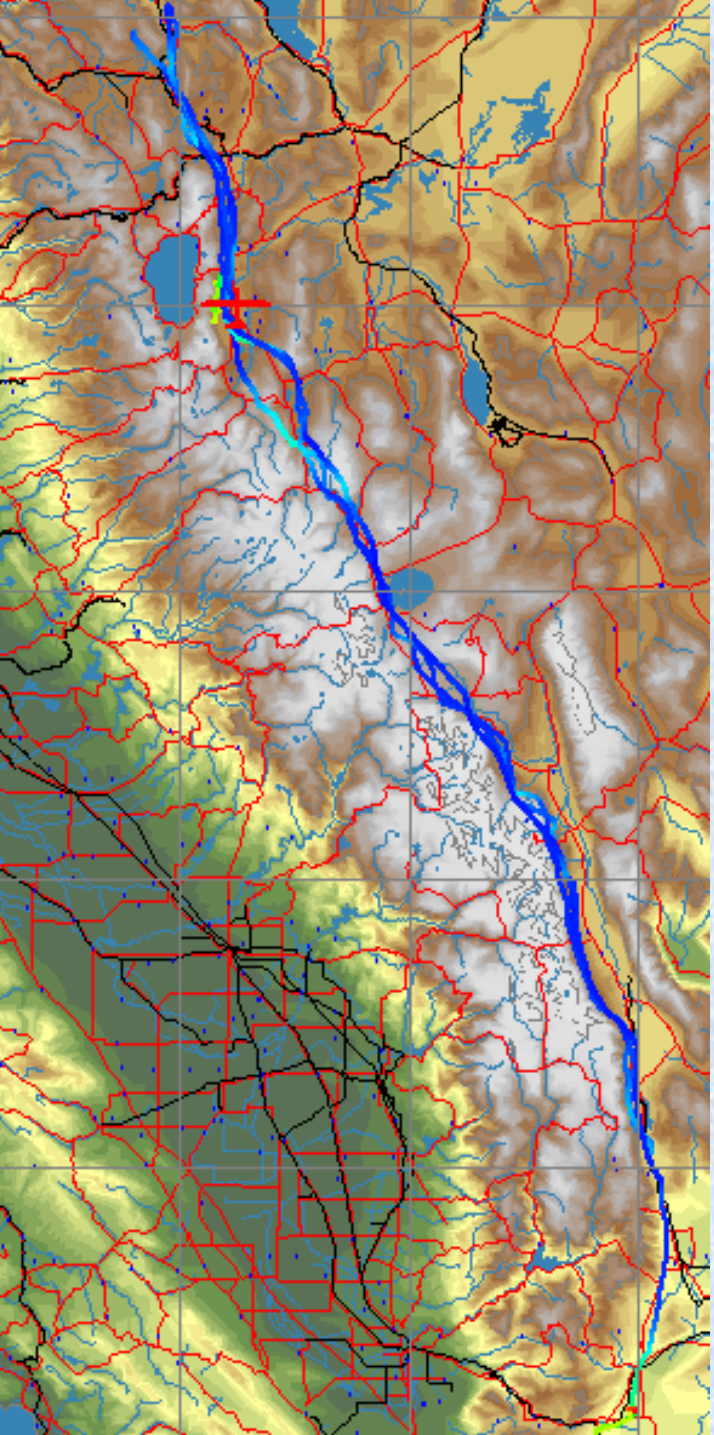
Track Record

- **9 Attempts**
  - 2003: 4 trys, 3 successful (200, 550, 580sm)
  - 2004: 5 trys, 2 successful (1024, 474sm)
- **Success =**
  - Correctly forecasting WX
  - Connecting to SYSTEMIC Sierra wave
  - >100 sm

Goal For this Flight

- To Safely and Comfortably,
- Fly as long as WX + terrain permit,
- For at least 1,500km
- Continued Exploration



Flight Events

- **Pilot View**
- **Decisions and Issues**
- **Critical Transitions**
  - Mammoth
  - Topaz
- **Flight Time: 10.3 h**
- **Task Time: 8.9 h**
- **Distance: 1,024.2 sm**
- **Ave speed: 115 mph**

First Climb 7:38a

Leg #1: Heading Out 8:21a

Leg #1: Reno 8:31a

Leg #1: Frenchman's Lake (TP 1) 8:45a

Leg #2: NW of Stead 8:52a

Leg #2: Carson Valley 9:14a

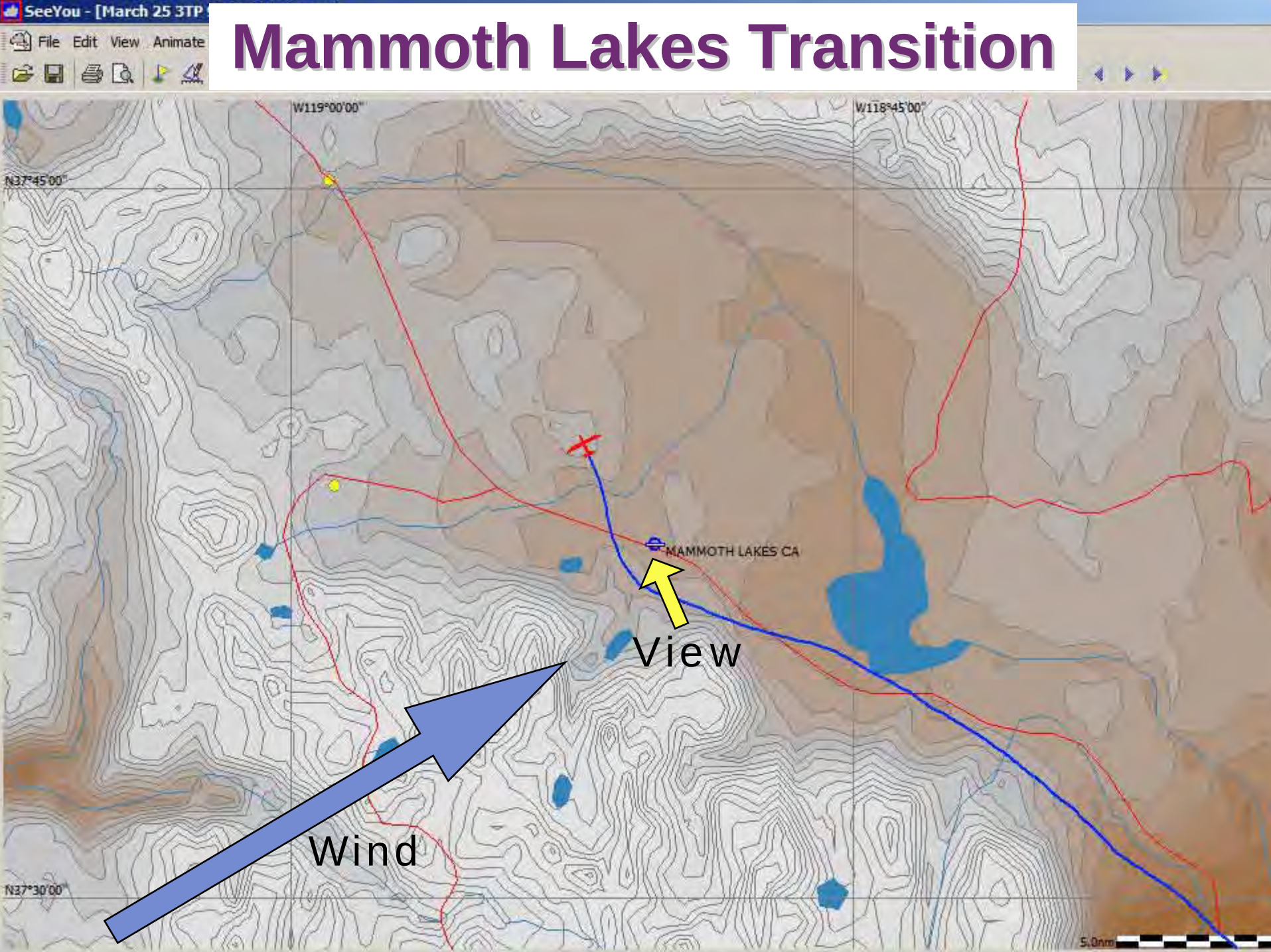
Leg #2: Mammoth 10:26a

Leg #2: Owens Valley 10:55a

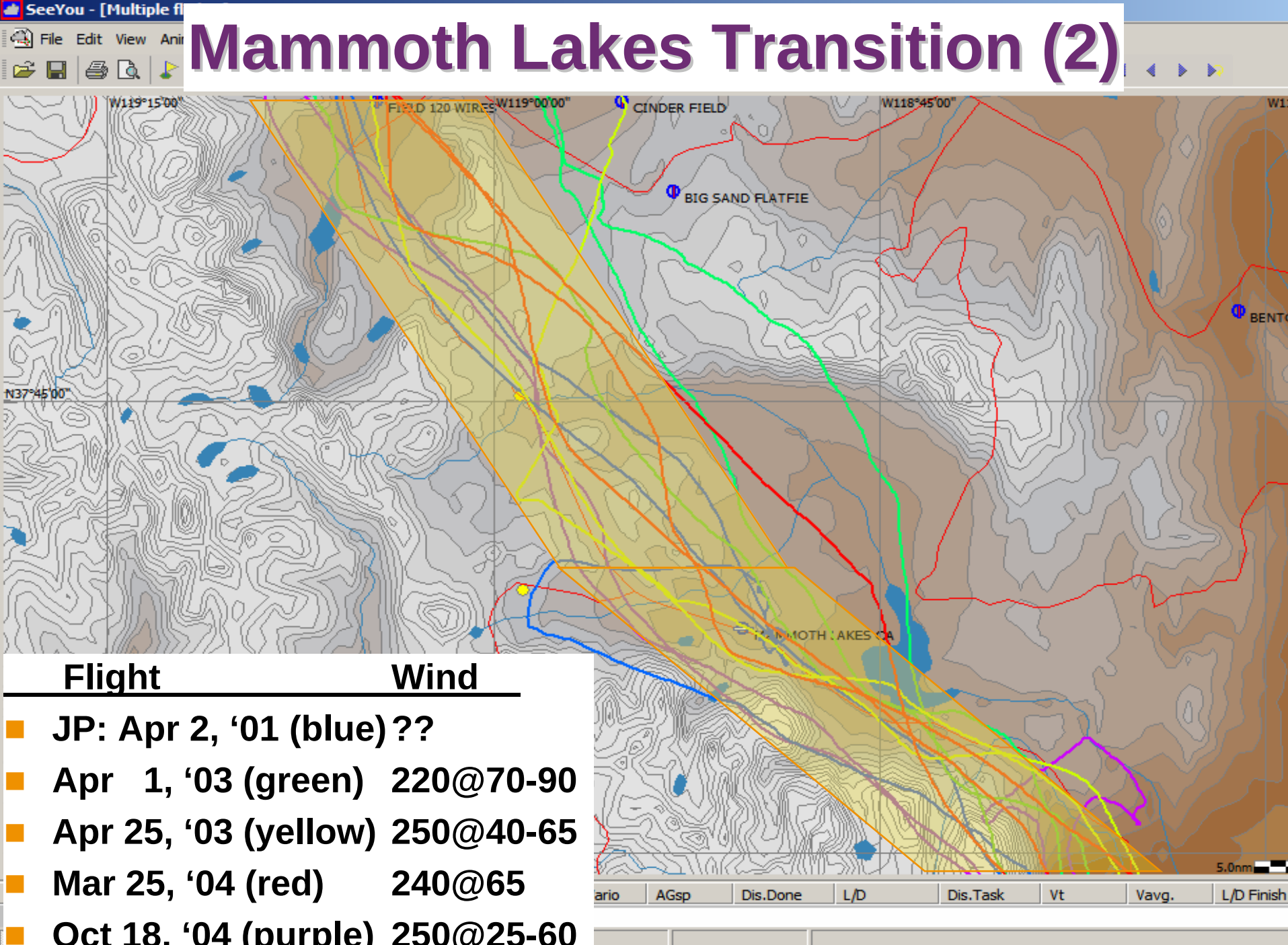
Leg #3: S end of Owens Valley 12:09p

Leg #3: Mammoth (upwind) 12:41p

Mammoth Lakes Transition



Mammoth Lakes Transition (2)

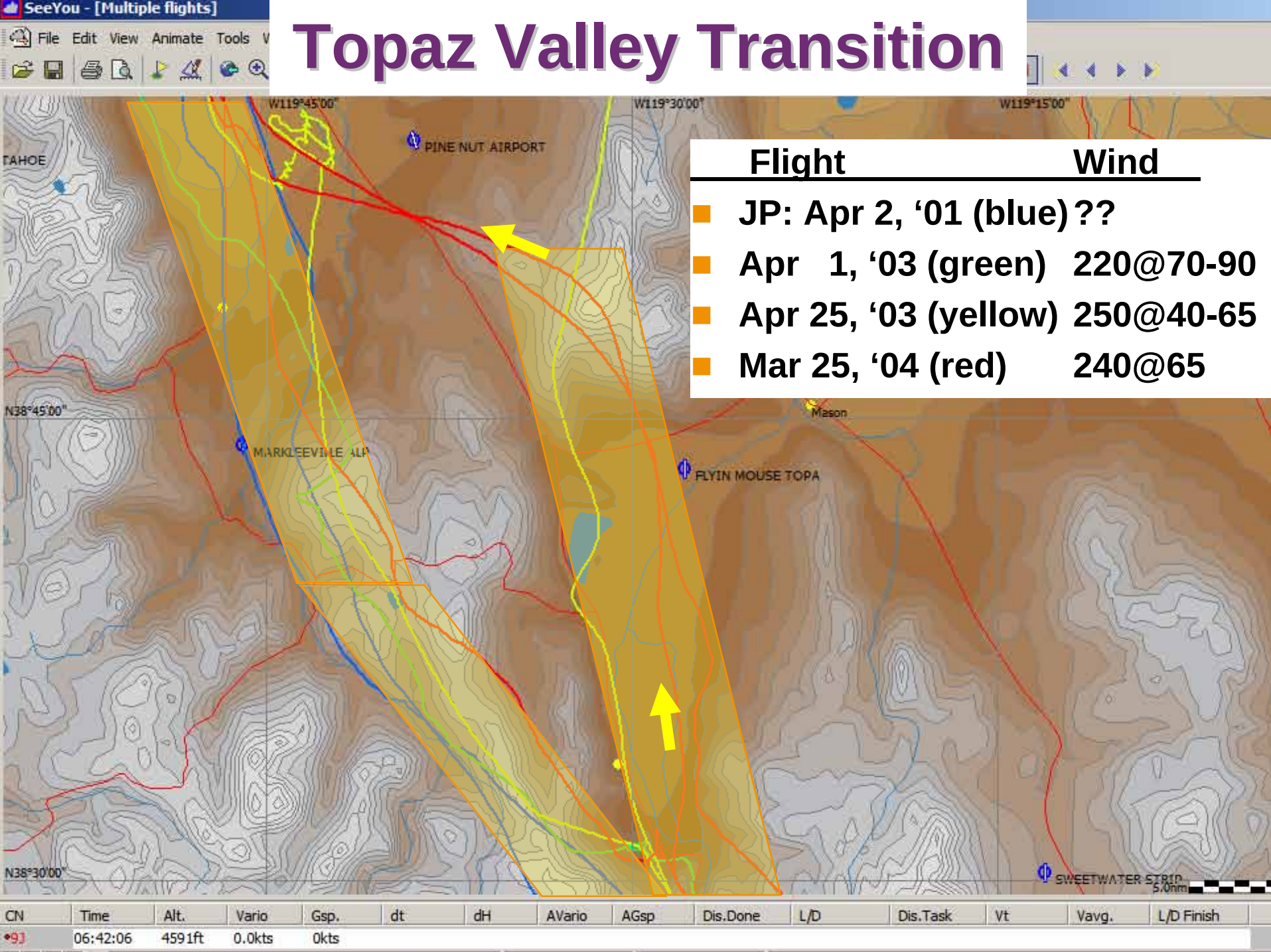


Flight	Wind
JP: Apr 2, ‘01 (blue)	??
Apr 1, ‘03 (green)	220@70-90
Apr 25, ‘03 (yellow)	250@40-65
Mar 25, ‘04 (red)	240@65
Oct 18, ‘04 (purple)	250@25-60

Leg #3: Lee Vining 12:52p

Leg #3: Topaz Valley 1:13p

Topaz Valley Transition



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Mar 25, ‘04 (red)	240@65

Leg #3: Doyle 1:49p

Leg #4: Stead 2:06p

Leg #4: Reno 2:10p

Leg #4: Bridgeport 3:01p

Leg #4: Owens Valley 3:53p

Leg #4: Sierra Crest 3:56p


Cal City 5:50p
9J

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South vs. North Start

- **North (MEV) Advantage**
  - Closer to incoming front (most times)
  - Strong local wave
  - “Uphill”
- **South (Cal City) Advantage**
  - Longer task
  - Lower risk of precip (most times)
  - Lower elevation
- **Both: Known people, lodging, food, airport**
- **Both: Controlled Airspace**
  - Joshua
  - Reno Int’l

Andes Flight Comparison

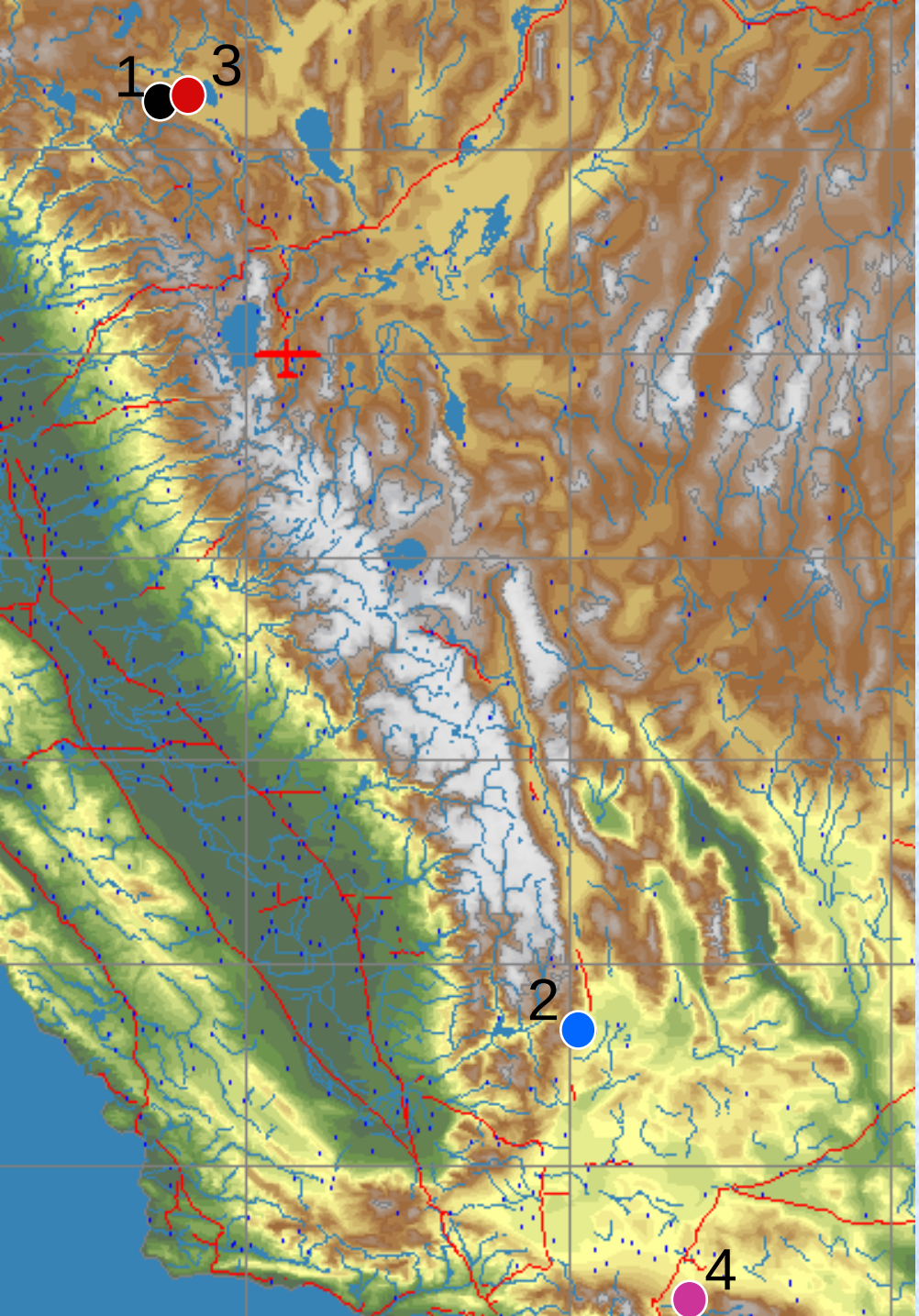
- Altitude Limits: 18K vs. 30K+
- Daylight: 12 hours vs. 14.5 hours
- Mountain Range: 350nm vs. 1000nm+

Andes lenticulars and rotor clouds taken from Jean-Marie Clement's Nimbus 4 during the 2003 Expedition to Patagonia. Image courtesy Fabrice Papazian.

Andes Flight Comparison

- Split Flow unlike Sierra
- Learn Spanish!

Andes lenticulars and rotor clouds taken from Jean-Marie Clement's Nimbus 4 during the 2003 Expedition to Patagonia. Image courtesy Dagfinn Gangsaas



Future Goals

- 2000km Free
- 2000km Diplome

Future Goals

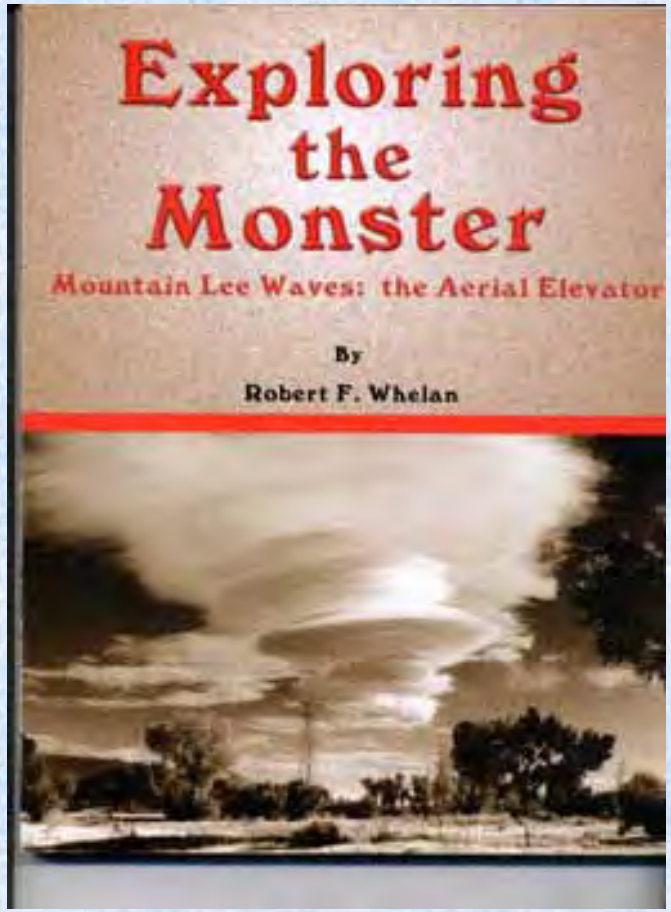
The big, BIG One

1000km

In a 1-26!

More Information

- **Exploring the Monster (Whelan)**
- **Further Reading:**
  - Speed-To-Fly in Upwind Wave Jumps (Trotter), 6-7/95
  - The Tiger was good to me (Hayes), 7/73
  - Flawed Diamond (Lamont), 8/69
  - Blowing down to Mexico (Newgard), 8/70
  - Carl Herold: 572 m O&R, 7/74
  - 1000km in Rockies Wave (Allan), 10-11/01



Same Sierra, Different Season

3rd leg beehive lennie