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Standardisation of UV doses for Vitamin D study.

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Cancer Research UK study of Vitamin-D in the general population

- Manchester and Salford
- > 240 volunteers split into 2 groups
- Age 20-60, active
- Skin types 1-4
- Vitamin D synthesis

CANCER RESEARCH UK

Study is in two parts

- Observational

  Measure Vit-D for 120 volunteers over a year. Also fill in diet and sun exposure questionnaires, and wear badges to record UV for four weeks during study.
- Intervention

  Give 120 volunteers known doses of UV on Phillips sunbed.

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Interventional study

- Comprises 3 visits per week for six weeks.
- Blood samples taken weekly.
- Record of diet during study
- Aim is to help in determining change in Vitamin D for a known dose of UV.

Phillips HB958 sunbed used in study.

Standardised Dose.

- Volunteers wear same clothes on sunbed to maintain constant skin exposure
- All volunteers use same position on sunbed.
- Study done in Jan and Feb when natural Vitamin-D synthesis nil.
- Check on diet during study.

Simulating Sunlight.

- For this project need to simulate natural sunlight.
- Need spectral output similar in shape to sunlight when weighted by Vitamin D action spectra.
- Used a combination of Cleo Natural and Arimed B lamps.

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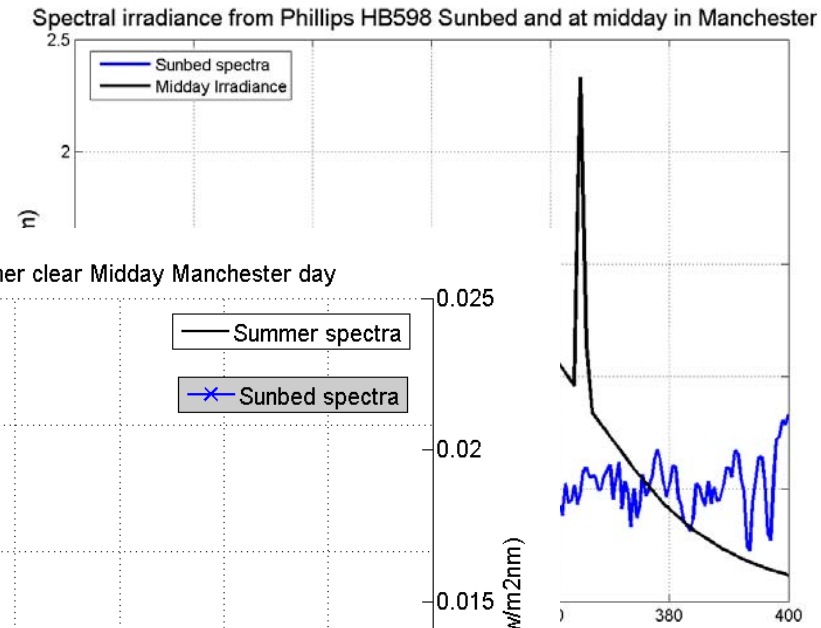
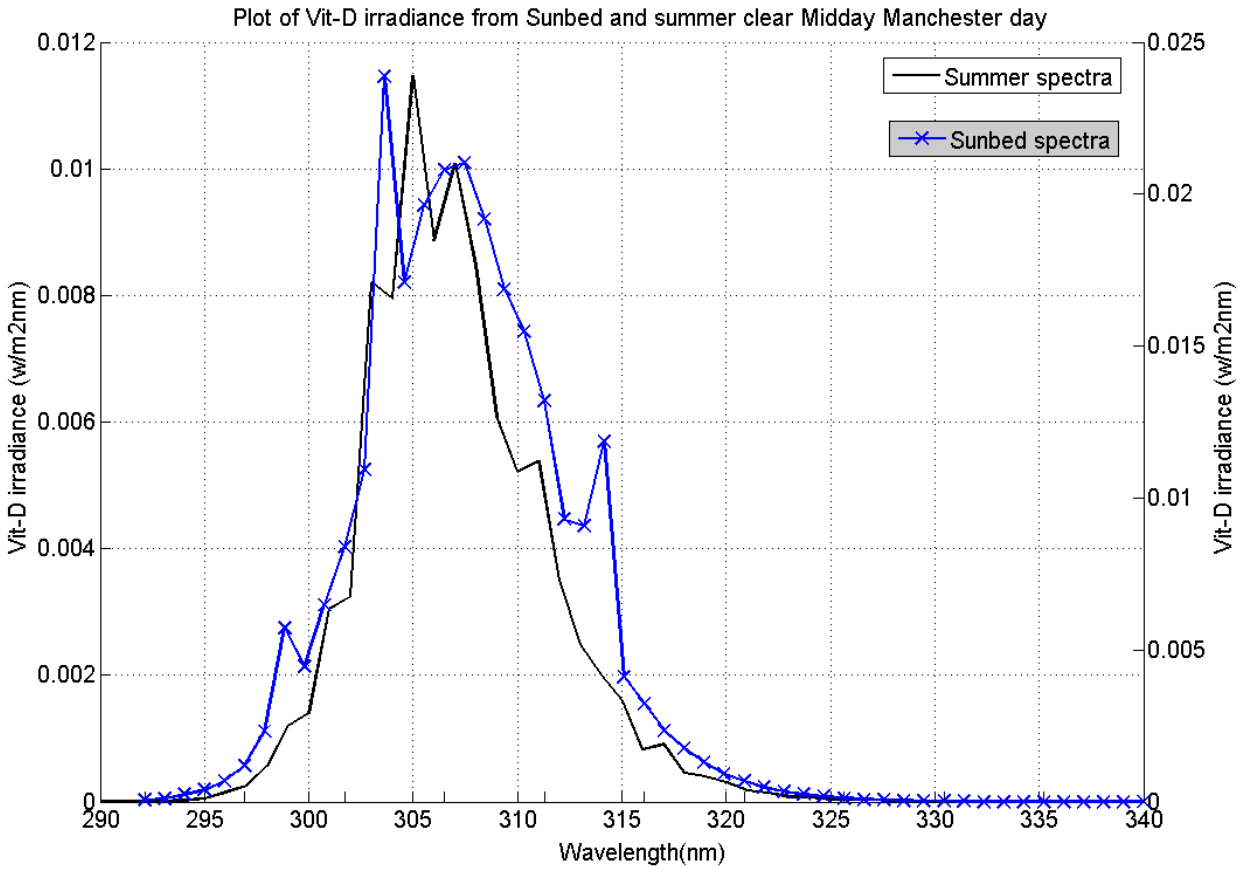




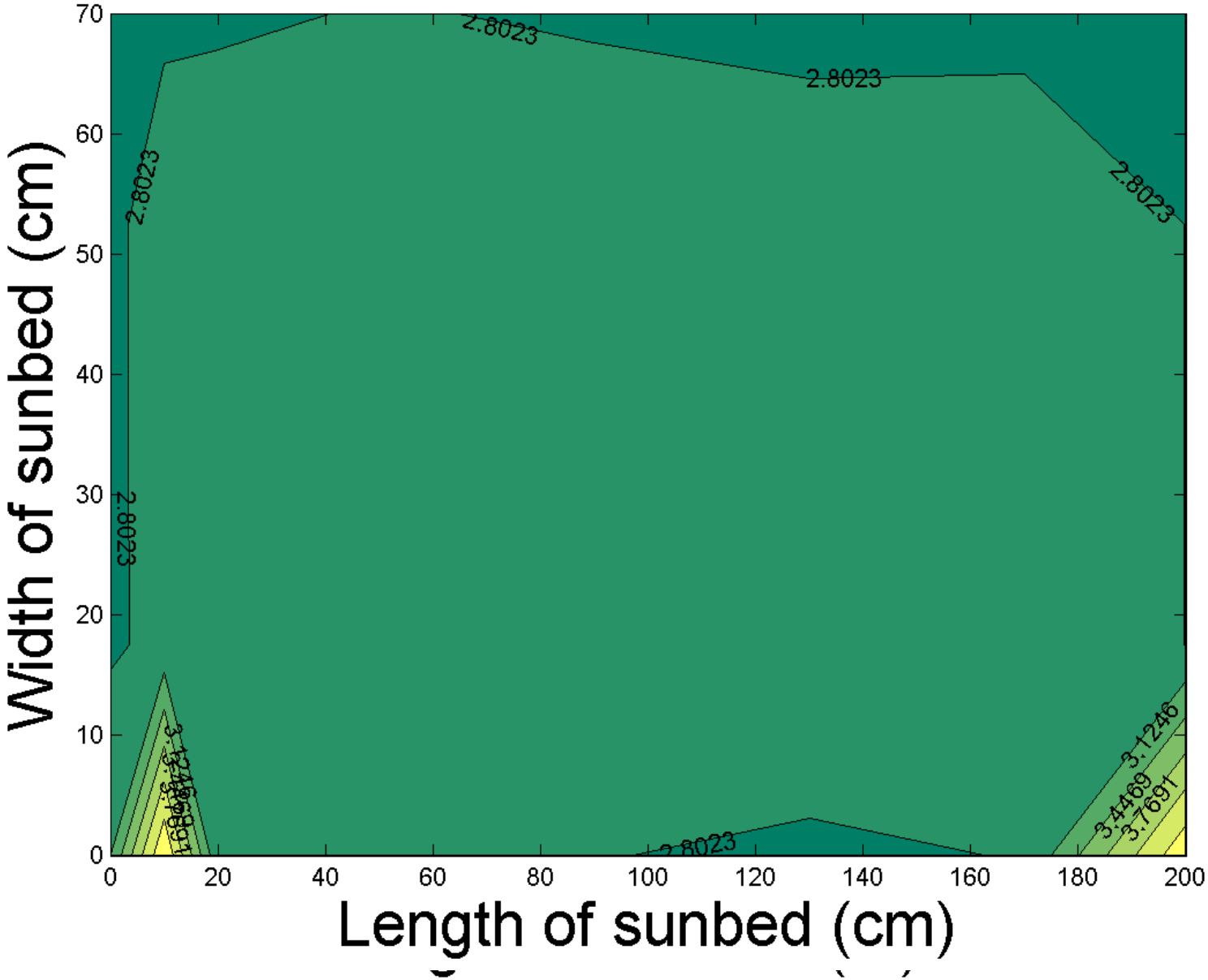
Measuring sunbed output

- Need to determine irradiance from sunbed
- Also distribution of radiation field within sunbed.
- Then can determine an average dose for volunteer.
- Used Bentham DTM 300 for initial checks then an Ocean Optics SD2000 for monitoring.

Average output of sunbed.

- Measured irradiance from upper and lower sections of sunbed.
- Averaged irradiance
- Small pilot study completed to estimate dose required to raise Vitamin D.
- Used 1.3 SED to give reasonable dose without risk of burning volunteers.
- Then for chosen dose determine time.

% difference in irradiance (22-18cm)for top

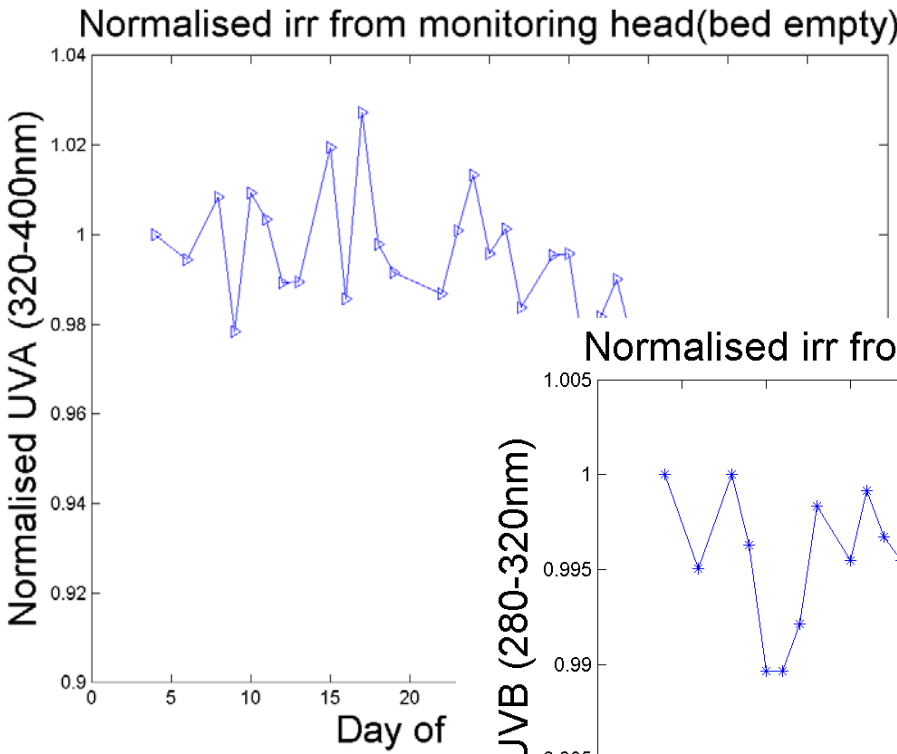


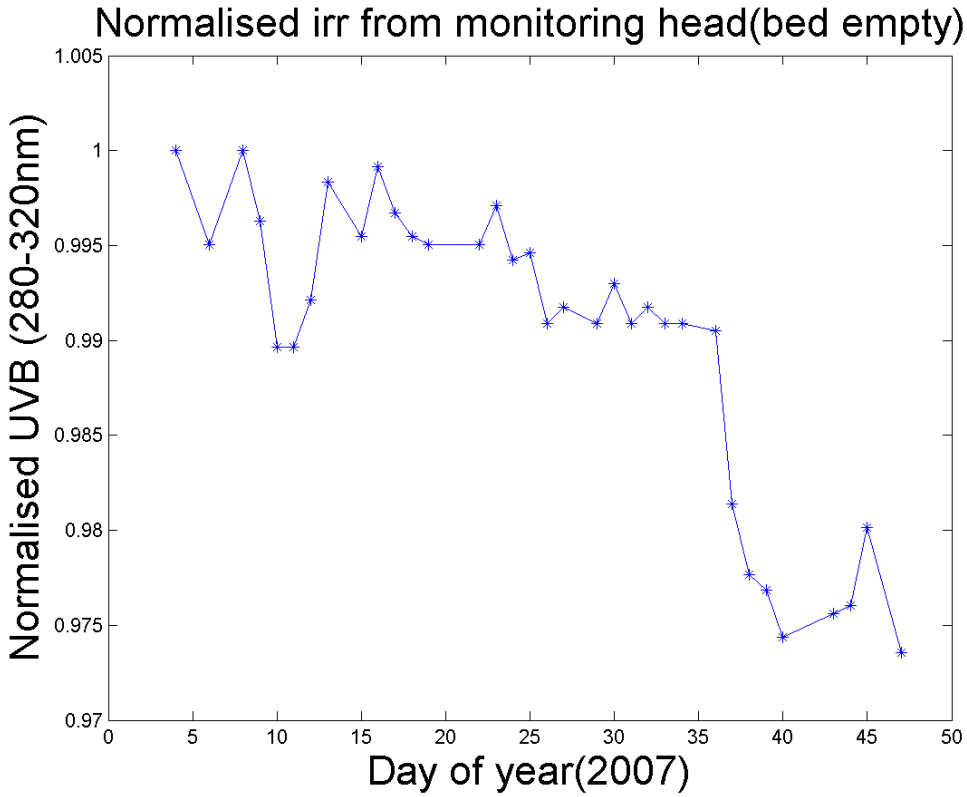
Monitoring

Used two methods to monitor:

- Continuous measurements during day with spectrometer mounted at end of bed. Several times with no-one on bed.

- Set of standard points every few days.





Simple Error Analysis

		(%)
Variation in sunbed over bottom	=	< 5
Variation in sunbed over top	=	< 5
Vertical variation	=	< 1
Warm up time	=	< 1
Possible variation in mains voltage	=	< 2
Decrease in lamp output with time	=	< 3

Total added in quadrature ~ 8 %

Conclusion

- Very difficult to give accurate UV doses on a sunbed.
- Biggest problem is people are different shapes, hair style, use different positions on bed etc.
- Accuracy of sunbed output ~ +/- 8%