Article title: Biologically meaningful moonlight measures and their application in ecological research

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Details of custom moonlight logger construction

The custom light logger was based on a TGP-4703 TinyTag Plus 2 voltage logger (Gemini Data Loggers, Chichester, United Kingdom), a light-dependent resistor (LDR), and a fixed resistor (Fig. 1). LDR was encapsulated in clear epoxy to increase the field-of-view of the resistor to 180 degrees (Fig. 2).

LDR (also known as photoresistor or photocell) is a passive component that decreases resistance when illuminated. When combined with a pulldown resistor to form a voltage divider, voltage drop across the LDR (V_{out}) can be measured. This particular logger provides 3.3V voltage to the sensor through the sense line and can read and record values between 0 and 2.5V. As illuminance increases, the resistance of the circuit drops, and therefore measured voltage increases up to 2.5V when the logger is “saturated”, therefore above a certain illumination level only a “bright” state is recorded, and light levels are no longer measured.

A CdS Photoconductive Photocell, model PDV-P8001 (Advanced Photonix, Camarillo, United States) was used which has a typical resistance of >0.2 MΩ at millilux light levels and approximately 70 KΩ at 1 lux. A resistor with an appropriate value (in this case 220 KΩ) was used to build a voltage divider circuit so that the logger would read values from approximately 0.5 V without light to approximately 2.5 V at 1 lux. It is worth noting that due to tolerances of both LDR and pulldown resistor, other resistance values might be required and need to be empirically tested even if the same LDR model is used.

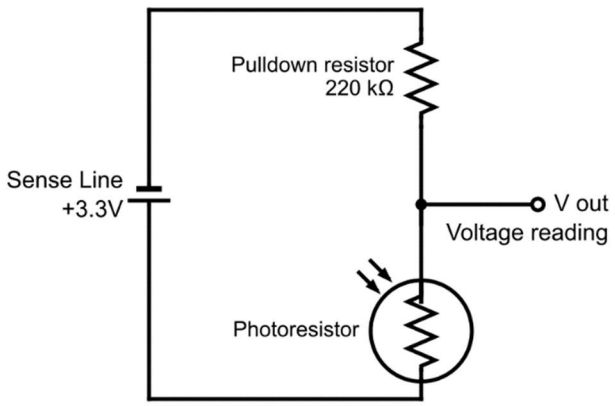

Fig. 1 *Diagram for the voltage divider circuit used to measure moonlight intensity*

Fig. 2 *Photoresistor encapsulated in a clear epoxy dome and mounted in the field on a metal bracket*