

# Package ‘fluspect’

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**Type** Package

**Title** Fluspect-B

**Version** 1.0.0

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**Description** A model for leaf fluorescence, reflectance and transmittance spectra. It implements the model introduced by Vilfan et al. (2016) <[DOI:10.1016/j.rse.2016.09.017](https://doi.org/10.1016/j.rse.2016.09.017)>. Fluspect-B calculates the emission of ChlF on both the illuminated and shaded side of the leaf. Other input parameters are chlorophyll and carotenoid concentrations, leaf water, dry matter and senescent material (brown pigments) content, leaf mesophyll structure parameter and ChlF quantum efficiency for the two photosystems, PS-I and PS-II.

**License** GPL-3

**Encoding** UTF-8

**Depends** R (>= 2.10)

**Imports** pracma, utils

**LazyData** false

**RoxygenNote** 6.1.1

**NeedsCompilation** no

**Repository** CRAN

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## Contents

define.bands . . . . .	2
fluspect . . . . .	2
write.leafopt . . . . .	3

<b>Index</b>	<b>5</b>
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define.bands            *define.bands*

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**Description**

define.bands defines the spectral regions for the Fluspect-B model

**Usage**

```
define.bands()
```

**Details**

Define spectral regions for SCOPE v\_1.40  
All spectral regions are defined here as row vectors  
WV Jan. 2013

**Value**

a spectral object.

**Author(s)**

Nastassia Vilfan, Christiaan van der Tol, Onno Muller, Uwe Rascher, Wouter Verhoef (Original version in Matlab)  
Alberto Hornero (Ported version into R)

**Examples**

```
spectral <- define.bands()
```

---

fluspect            *fluspect*

---

**Description**

fluspect calculates reflectance and transmittance spectra of a leaf using FLUSPECT-B, plus four excitation-fluorescence matrices

**Usage**

```
fluspect(leafbio, spectral = define.bands(), optipar = NULL)
```

**Arguments**

leafbio	Data Frame. It contains: Cab, Cca, Cw, Cdm, Cs, N, fqe
spectral	List. (Optional) A spectral object created with <a href="#">define.bands</a> . A default spectral object is used if the user does not indicate any.
optipar	Data Frame. (Optional) It contains: nr, Kdm, Kab, Kca, Kw, Ks, phiI, phiII. A default optipar object is used if the user does not indicate any.

**Details**

More information: [Fluspect-B: A model for leaf fluorescence, reflectance and transmittance spectra. Vilfan et al., 2016](#)

Original version in MatLab: [github.com/Christiaanvandertol/Fluspect](https://github.com/Christiaanvandertol/Fluspect)

**Value**

a list which contains:

- refl (reflectance)
- tran (transmittance)
- Mb (backward scattering fluorescence matrix, I for PSI and II for PSII)
- Mf (forward scattering fluorescence matrix, I for PSI and II for PSII)

**Author(s)**

Nastassia Vilfan, Christiaan van der Tol, Onno Muller, Uwe Rascher, Wouter Verhoef (Original version in Matlab)

Alberto Hornero (Ported version into R)

**Examples**

```
leafbio <- data.frame(Cab = 70, Cca = 30, Cw = 0.013, Cdm = 0.024, Cs = 0.0, N = 4.09, fqe = 0.02)
leafopt <- fluspect(leafbio)
plot(leafopt$refl)
```

---

write.leafopt

*write.leafopt*

---

**Description**

write.leafopt writes the leafopt object as text files

**Usage**

```
write.leafopt(leafopt, path, digits = 5)
```

**Arguments**

leafopt	List. Spectral object generated with <a href="#">fluspect</a>
path	String. Output path. If the directory does not exist, a new one will be created.
digits	Integer. (Optional) Number of digits (by default 5)

**Details**

It always writes the text files in UNIX format, under the specified output path. It will override if files already exists. The output filenames are:

- leafoptrefl.txt
- leafopttran.txt
- leafoptkChlrel.txt
- leafoptMbI.txt
- leafoptMbII.txt
- leafoptMfI.txt
- leafoptMbII.txt

**Author(s)**

Alberto Hornero

**Examples**

```
leafbio <- data.frame(Cab = 70, Cca = 30, Cw = 0.013, Cdm = 0.024, Cs = 0.0, N = 4.09, fqe = 0.02)
leafopt <- fluspect(leafbio)
write.leafopt(leafopt, path = file.path(tempdir(), 'output'))
```

# Index

`define.bands`, [2](#), [3](#)

`fluspect`, [2](#), [4](#)

`write.leafopt`, [3](#)