

SOLAR: RADIACIÓN SOLAR Y SISTEMAS FOTOVOLTAICOS CON R

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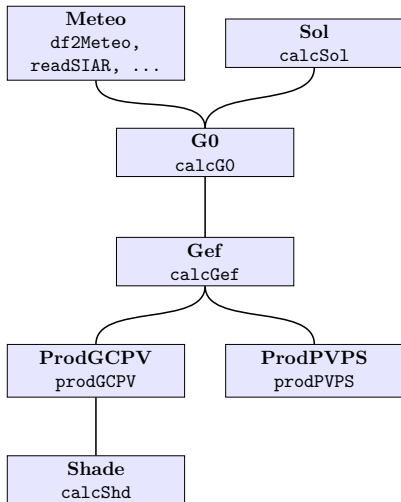
<http://solar.r-forge.r-project.org>

17 de Noviembre de 2011

INTRODUCCIÓN

- ▶ Desde la geometría solar, pasando por la irradiación efectiva en un plano hasta la productividad de un sistema fotovoltaico.
- ▶ Clases y métodos S4.
- ▶ zoo para construir series temporales multivariantes.
- ▶ lattice y latticeExtra para métodos de visualización.

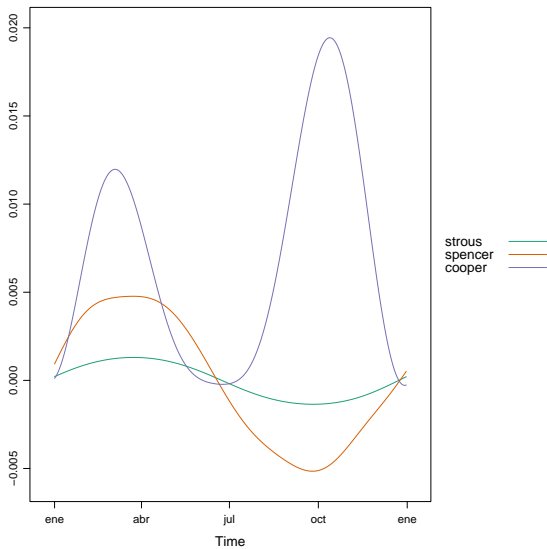
CLASES



GEOMETRÍA SOLAR

```
> lat = 37.2
> BTd = fBTd(mode = "serie")
> solStrous <- fSold(lat, BTd, method = "strous")
> solSpencer <- fSold(lat, BTd, method = "spencer")
> solCooper <- fSold(lat, BTd, method = "cooper")
> solMichalsky <- fSold(lat, BTd,
  method = "michalsky")
> decDif <- solMichalsky$decl - cbind(solStrous$decl,
  solSpencer$decl, solCooper$decl)
> names(decDif) <- c("strous", "spencer",
  "cooper")
```

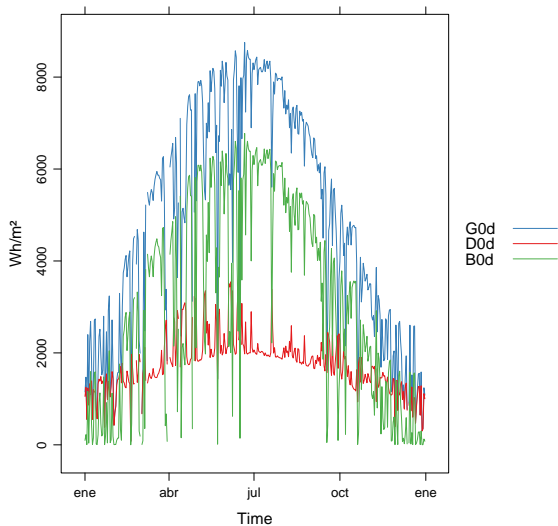
GEOMETRÍA SOLAR



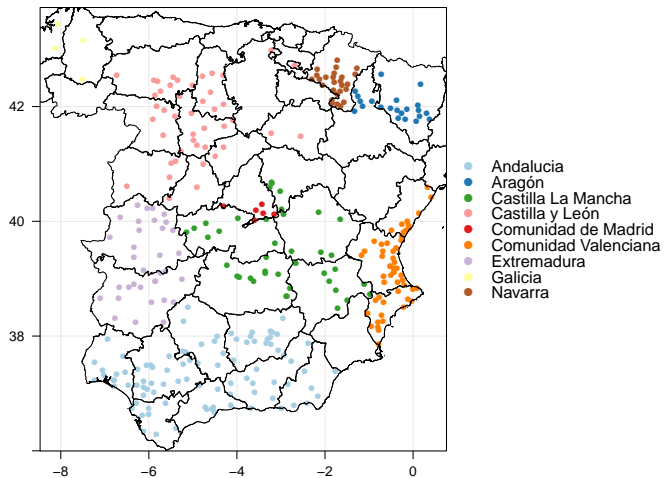
RADIACIÓN SOLAR EN EL PLANO HORIZONTAL

```
> g0 <- calcG0(lat = 37.2, modeRad = "siar",  
  dataRad = list(prov = 28, est = 3,  
    start = "01/01/2009", end = "31/12/2009"))
```

RADIACIÓN SOLAR EN EL PLANO HORIZONTAL



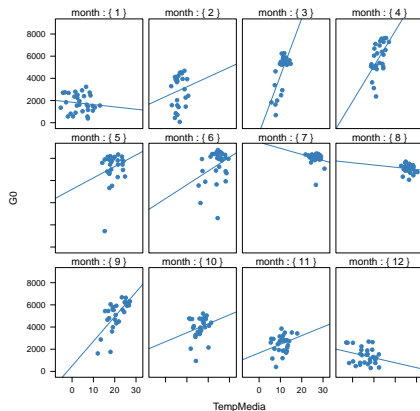
SIAR



<http://www.marm.es/siar>

<http://solar.r-forge.r-project.org/data/SIAR.csv>

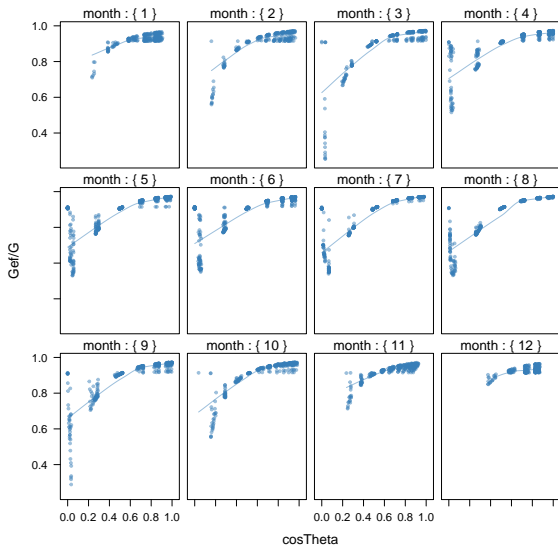

```
> Aranjuez <- readSIAR(28, 3, "01/01/2009",  
  "31/12/2009")
```



RADIACIÓN SOLAR EN UN PLANO INCLINADO

```
> g0 <- calcG0(lat = 37.2, modeRad = "siar",  
  dataRad = list(prov = 28, est = 3,  
    start = "01/01/2009", end = "31/12/2009"))  
> gef <- calcGef(lat = 37.2, modeRad = "prev",  
  dataRad = g0, beta = 30)  
> xyplot(Gef/G ~ cosTheta | month,  
  data = gef, type = c("p", "smooth"),  
  cex = 0.4, alpha = 0.5)
```

RADIACIÓN SOLAR EN UN PLANO INCLINADO



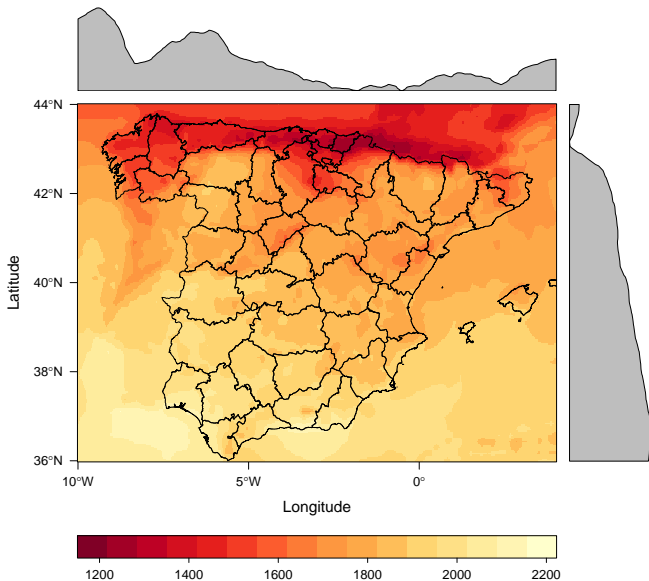
RADIACIÓN SOLAR EN UN PLANO INCLINADO

SOLAR Y RASTER

```
> library("raster")
[...]  
> foo <- function(x, ...) {  
  gef <- calcGef(lat = x[1],  
    dataRad = list(GOdm = x[2:13]))  
  result <- as.data.frameY(gef)[c("Gefd",  
    "Befd", "Defd")]  
  as.numeric(result)  
}  
> latLayer <- init(SISmm, v = "y")  
> gefS <- calc(stack(latLayer, SISmm),  
  foo, filename = "CMSAF/gefCMSAF",  
  overwrite = TRUE)
```

RADIACIÓN SOLAR EN UN PLANO INCLINADO

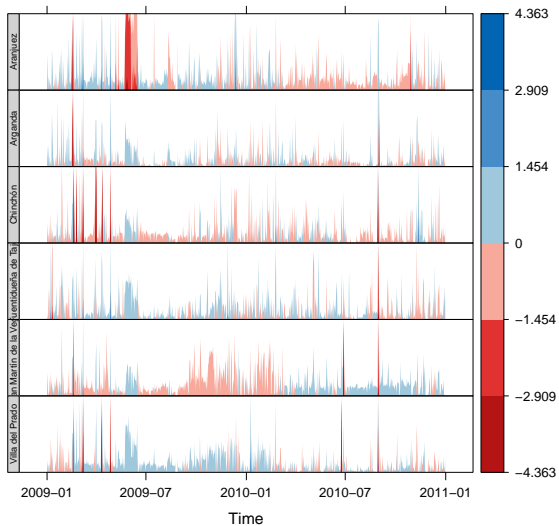
SOLAR Y RASTER



PRODUCTIVIDAD DE UN SFCR

```
> EstMadrid <- subset(SIAR, Provincia == "Madrid")
> nEstMadrid <- nrow(EstMadrid)
> namesMadrid <- EstMadrid$Estacion
> prodMadrid <- lapply(1:nEstMadrid, function(x) {
  try(prodGCPV(lat = 41, modeRad = "siar",
    dataRad = list(prov = 28, est = x,
    start = "01/01/2009", end = "31/12/2010")))
})
> names(prodMadrid) <- namesMadrid
> okMadrid <- lapply(prodMadrid, class) != "try-error"
> prodMadrid <- prodMadrid[okMadrid]
> YfMadrid <- do.call(mergesolaR, prodMadrid)
```

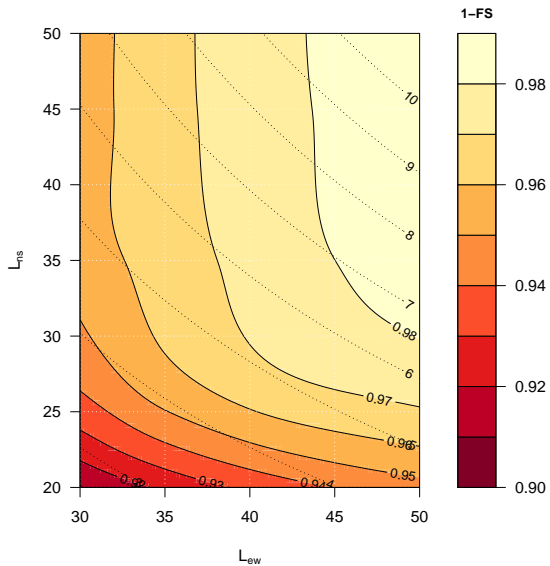
PRODUCTIVIDAD DE UN SFCR



SOMBRAS EN UN SFCR

```
> struct2x = list(W = 23.11, L = 9.8,  
  Nrow = 2, Ncol = 8)  
> dist2x = list(Lew = c(30, 50),  
  Lns = c(20, 50))  
> ShdM2x <- optimShd(lat = lat, dataRad = prom,  
  modeTrk = "two", modeShd = c("area",  
  "prom"), distances = dist2x,  
  struct = struct2x, res = 5,  
  prog = FALSE)  
> shadeplot(ShdM2x)
```

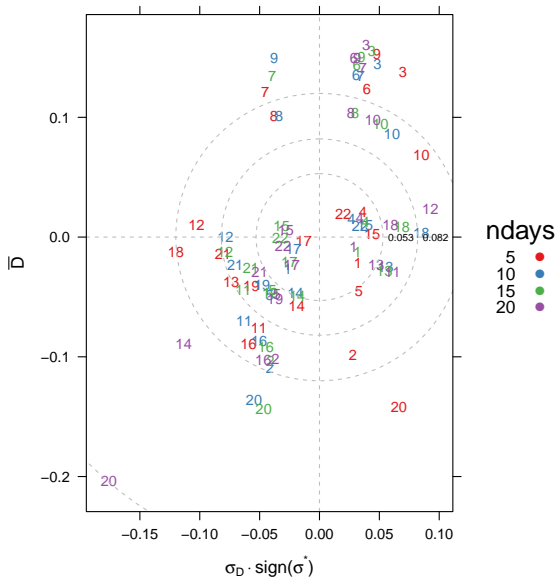

SOMBRAS EN UN SFCR



TARGET DIAGRAM

```
> data("prodEx")
> ndays = c(5, 10, 15, 20)
> palette = brewer.pal(n = length(ndays), name = "Set1")
> TDColor <- TargetDiagram(prodEx, end = day,
  ndays = ndays,
  color = palette)
```

TARGET DIAGRAM



BIBLIOGRAFÍA I

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<http://www.jstatsoft.org/v14/i06/>