

Index / 107 format

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107 format is used to output the location of active parcels during forward or backward integrations. It is also used to store the index at the beginning of each run.

Near real time runs: The index is defined at the beginning of each integration sequence. It describes the starting position of parcels which are active. In a new parcels run, it contains the initial position of the parcels to be launched and the time of the launch. These parcels are determined from the analysis of the satellite data of Meteosat 7 (NM) and Himawari (NHd) or from the pseudo-observations generated by the ECMWF forecast (M10). The contained index just go from 1 to nact. In a old parcels run, it contains the starting position of parcels which are still active after concatenation of the previous indexes and elimination of dead particles. The index refers to the position in the previous index files (check if implemented in this way),

This section can be skipped as it describes an obsolete format

Ancien format pour M7 data (trace pour mémoire seulement, utilisé dans les scripts matlab de Ann'Sophie et les anciens runs forward à partir de CLAUS)

Binaire, IEEE 32bits

Record 1: numpart

Les autres enrgts sont tous de longueur numpart

Record 2: flagTB (entier) 1: Meteosat , 2: Himawari

Record 3: ir_start (temps de départ, en s, compté à partir de 0 à l'échéance)

Record 3: x (longitude de départ en degré)

Record 4: y (latitude de départ en degré)

Record 5: p (pression de départ en Pa)

Record 6: T (température de départ en K)

Format 107:

107 format is used to output the location of active parcels during forward or backward integrations. It is also used to store the index at the beginning of each run.

The format is a Fortran 32-bit binary file.

The idea to use netcdf is resisted. To be reconsidered only the data are to be distributed outside.

Record	Size	Content	Note
1	3 int(4)	Lhead Outfmt Mode	# of record in the heading Value: 107 =0, new index file; =1, historical file; =2, old index file; =3, preparation of forward/backward trajectories
2	1 int(8) 2 int(4)	Stamp_date itime Step	Format (decimal) YYYYMMDDHHmmss (int 8) Output time (s) Time step (s)
3	3 int(4)	Numpart Nact	# of parcels # of active parcels

		Idx_orgn Nact_lastO Nact_lastNM Nact_lastNH	Index of first parcel # of active parcels from O # of active parcels from NM # of active parcels from NH
4	Nact int(4)	Flag	Voir ci-dessous
5	Nact int(4)	Ir_start	Launch time. 2 possible format (in s from stamp date or in absolute format as in record 2)
6	Nact real(4)	x	Longitude (degree)
7	Nact real(4)	y	Latitude (degree)
8	Nact real(4)	P	Pressure (Pascal)
9	Nact real(4)	T	Temperature (Kelvin)
10	Nact int(4)	Idx_back	Mode 0: Index of old parcels in the list at stamp date - 12h. Undefined (=- $(2^{**} 31-1)$) for new parcels. Mode 1: Index of current active parcels among the list of parcels at stamp_date.

Notes:

- Mode 0: Nact = numpart
- Mode 3: implemented in prepack
- The stampdate is a reference time that serves as time origin in the file. It does not need to be the starting time of the run
- Important: Implicitely, the new parcels at any given time, follow the old parcels in the order of the index when index are collated.
- Therefore the index in the old_idx file at a given time t spans first the numpartO(t-12) old particles at time t-12 and then extend from numpartO(t-12)+1 to numpartO(t-12)+numpartN(t-12)
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- Nomenclature
 - Old_idx: index file built at time t containing the initial position of active old particles at that time and the index of these particles among the active old particles and the new particles at time t-12
 - numpartO(t) number of old parcels at time t
 - numpartN(t) number of new parcels at time t
 - nactO(t) number of active old parcels at time t
 - nactN(t) number of active new parcels at time t

Flag data

Bits	Valeurs	Masque	shift
0:3	0: Meteosat 7 1: Himawari 2: Meteosat X 3: MSG 1 4: MSG 3 5: SAFNWC Autres valeurs pour autres satellites 13: Vertical profile 14: Flight data 15: Fill grid (backward or forward)	0xF	

4	0: Old parcel from a previous run 1: New parcel	0x10	4
5	1: Launch time (in seconds) is defined from the stamp date. It is negative for old parcels and can be positive for new parcels 0: Absolute time (decimal) as YYYYMMDDHH ACHTUNG: Minutes and seconds cannot be stored in the 32-bit format	0x20	5:s
6	0: Vertical pressure coordinate 1: Theta vertical coordinate	0x40	6
7:12	Coding the source region	0x1F80	7
13:16	Cause of the exit of the parcel from the domain (not used until now) 1: Down 2: Up 3: W 4: N 5: E 6: S 7: Unknown 8-16 : available for other tests	0x1E000	13
17	Inversion in the profile	0x20000	17
18	$T < T(\text{cold point})$	0x40000	18
19	Overshooting before correction	0x80000	19
20	Overshooting after correction	0x100000	20
21	DEAD	0x200000	
22	HIT	0x400000	
23	OLD	0x800000	
24	DBORNE	0x1000000	
25	CROSSED	0x2000000	
26	GOOD	0x8000000	
27	OPAQ	0x10000000	

The index is defined from the first index, that is it lays within the interval [idx_orgn, idx_orgn+numpart-1]. In practice idx_orgn is 1. It should have been 0. Notice that many exploitation programs at the moment depend on idx_orgn being 1.

Concatenation programme

This programme is needed to propagate data and build new indexes from current ones to be exploited in the next integration period.

The program concatenate two files and can be applied recursively.

A second program concatenates the part files to make a new part_000

In the part files using also 107 format, the index refers to the position of the parcel in the index file belonging to the same directory.

In the backward calculations, the index file is the part_000 file.

Reduction of the index from one forecast to the next requires to build a new index limited to the active parcels.

The program takes as input the old index file and the part file containing the active parcels at the time when the new forecast starts. Another argument is the start of the new index, which is useful when several old runs are merged. The result is a new reduced index file and a new part_000 file (this is actually splitted in two programmes) that can be used to start TRACZILLA.

The new part file is such that

- numpart is made equal to nact
- The indexation runs from 1 to numpart (or idx_orgn to numpart+idx_orgn-1)

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In TRACZILLA

Dans StratoClim, on utilise la fonction redémarrage démarrer le run vieilles parcelles en fabricant un fichier part_000 (léger dévoiement de la procédure). Le démarrage avec fixparticlesStratoClim est réservé à la lecture de l'index pour des parcelles nouvelles.

Par ailleurs, il faut que ce run démarre 6 heures avant le stamp_date, au temps itime=-43200. Les temps restent comptés à partir du stamp_date.

Modifications à réaliser avant version git et backup

- Enlever la sortie savpos (loutsav mis à grande valeur)
- Sortie des diags toutes les 12h pour le nombre de parcelles
- Modifications à réaliser après version git
 - Sortie en mode 107
 - Modif correspondante du restart
 - Lecture avec vérification du lock et attente si fichier absent
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- Runs
- Nomenclature
 - Historique et nouvelles parcelles dans deux répertoires différents
 - Répertoire pour chaque run
 - YYYYMMDDHH
- Runs forward: the last 8 bits are used to store CT

Programme de recombinaison standard

Procédure python appelant des programmes Fortran ou entièrement en python

Fonctionnalités pour une date YYYYMMDDHH

Dans le répertoire O, pour date-12h

Lit part-012 et parcel_launch, et applique la procédure de réduction, le produit est placé dans deux fichiers temporaires part_000_a et parcel_launch_a du répertoire mode1 de YYYYMMDDHH.

Retourne le # de parcelles actives

Dans le répertoire N, pour date-12h

Lit part-012 et parcel_launch, prend également en entrée le # de parcelles actives de l'étape précédente.

Applique la procédure de réduction et crée un part_000b et un parcel_launch_b au même endroit que l'étape 1.

Dans le répertoire O, pour date

Concatène part_000_a et part_000_b en un seul fichier part_000.

Concatène parcel_launch_a et parcel_launch_b en un seul fichier parcel_launch.

Retourne le nombre de parcelles actives qui est sorti dans un fichier qui sera lu au moment de la préparation de l'initialisation du mode N.

Noter que N sera par la suite divisé en NM et NH. On prend donc les

devant et on définit un répertoire NM.

Masque de source

Wpool	1
IO	2
India	3
Tibet	4
China	5
Pen	6
BoB	7
SCSPHi	8
Phi	9
IndMal	10
NCP	11
Med	12
Seur	13
Arab	14
RedSea	15
PGulf	16
NAf	17
CNAf	18
CAsia	19
Caspian	20
WPac	21
MidNPac	22
NEAsia	23
GG	24
HighN	25
NAus	26
SAus	27
CSAf	28
SEP	29
ITA	30
CAm	31
SAm	32