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Schema for the LANL infrasound analysis tool, infrapy

Fransiska Dannemann
Omar Marcillo

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1.0 Introduction

The purpose of this document is to define the schema used for the operation of the infrasound analysis tool, infrapy. The tables described by this document extend the CSS3.0 or KB core schema to include information required for the operation of infrapy. This document is divided into three sections, the first being this introduction. Section two defines eight new, infrasonic data processing-specific database tables. Both internal (ORACLE) and external formats for the attributes are defined, along with a short description of each attribute. Section three of the document shows the relationships between the different tables by using entity-relationship diagrams.

This schema is a work in progress and may be updated as development of infrapy continues.

2.0 Table Descriptions

This section describes the logical structure of each table used in the Infrapy software package. The name of the table is first, followed by a description of the purpose and use of the table. Below the description is a listing of the columns, in the order which they are defined in the tables. The storage column gives the actual ORACLE datatype for the column in question. The external format and character positions columns are provided for the convenience of database users who wish to transfer data between the ORACLE database tables and flat files.

2.1 Conventions

The following conventions are used, following Carr et al (2002):

Element	**Appearance**	**Example**
Database table	Bold	**arrival**
Database columns	Italic	*sta*
Database table and column when written in the dot notation	Bold.italic	**arrival**.*sta*
Value of a key or component of a key	Courier font	arid

2.2 Table Definitions: Infrapy-Specific Tables

Tables 2.10 through 2.18 are specific tables created during data processing in infrapy. Each table lists the columns in the table, along with the ORACLE storage type, the external format and character position that should be used if the information is provided in a flat file, and a short description of the column. For more detailed definitions of the columns, please see section 4.0.

fk_params

The **fk_params** table defines parameters for fk processing defined in the configuration file.

Table 2.1: fk_params					
Relation:		**fk_params**			
Description:		Parameters for fk processing			
attribute name	field no.	storage type	external format	character positions	attribute description
pfkid	1	integer	9d	1-9	fk processing id
name	2	string(32)	32.32s	11-42	fk process
filtertype	3	string(15)	15.15s	44-58	filter type
filterl	4	float(53)	5.3f	60-64	filter lower limit
filterh	5	float(53)	5.3f	66-70	filter higher limit
fkfreql	6	float(53)	5.3f	72-76	fkfreq lower limit
fkfreqh	7	float(53)	5.3f	78-82	fkfreq higher limit
wlen	8	float(53)	8d	84-91	fk window length
overlapwlen	9	integer	9d	93-101	overlap window length
minslowness	10	float(53)	5.3f	103-107	x minimum slowness
maxslowness	11	float(53)	5.3f	109-113	y minimum slowness
stepslowness	12	float(53)	5.3f	115-119	slowness step
numsources	13	integer	9d	121-129	number of sources
additional1	14	float(53)	9.4f	131-139	?
additional2	15	float(53)	9.4f	141-149	?
algorithm	16	string(15)	s15.15	151-165	fk algorithm

fk_results

The **fk_results** table stores fk processing results.

Table 2.2: fk_results					
Relation:		**fk_results**			
Description:		FK processing results			
attribute name	field no.	storage type	external format	character positions	attribute description
pfkid	1	integer	9d	1-9	fk processing id
fkid	2	integer	9d	11-19	fk result id
chan	3	string(8)	8.8s	21-28	channel
nchan	4	integer	9d	30-38	number of channels
sta	5	varchar2(6)	a6	40-45	station
timeini	6	float(53)	17.5f	47-63	time in
timeend	7	float(53)	17.5f	65-81	time end
sx	8	float(24)	5.3f	83-87	slowness x direction
sy	9	float(24)	5.3f	89-93	slowness y direction
esx	10	float(24)	5.3f	95-99	?
esy	11	float(24)	5.3f	101-105	?
bz	12	float(53)	7.2f	107-113	backazimuth
slofk	13	float(24)	9.4f	115-123	slowness
ebz	14	float(53)	7.2f	125-131	?
eslofk	15	float(24)	9.4f	133-141	?
fval	16	float(24)	9.4f	143-151	F value
xcorrvalmax	17	float(24)	9.4f	153-161	maximum x correlation value
xcorrvalmean	18	float(24)	9.4f	163-171	mean x correlation value
rmsval	19	float(24)	9.4f	173-181	rms value
sourcenum	20	integer	9d	183-191	number of sources
additional1	21	float(24)	9.4f	193-101	?
additional2	22	float(24)	9.4f	103-111	?

fd_params

The **fd_params** table defines parameters for detection processing defined in the configuration file.

Table 2.3: fd_params					
Relation:		**fd_params**			
Description:		FD processing parameters			
attribute name	field no.	storage type	external format	character positions	attribute description
pfdid	1	integer	9d	1-9	fd processing id
name	2	string(32)	32.32s	11-42	processing name
pthr	3	float(53)	9.4f	44-52	p threshold
cthr	4	float(53)	9.4f	54-62	correlation threshold
numsource	5	integer	9d	64-72	number of sources
adapwlen	6	float(53)	8d	74-81	adaptive window length
minlen	7	float(53)	8d	83-89	minimum event length
algorithm	8	string(15)	s15.15	91-105	detection algorithm
additional1	9	float(24)	9.4f	107-115	?
additional2	10	float(24)	9.4f	117-125	?

fd_results

The **fd_results** table stores detection results.

Table 2.4: fd_results					
Relation:		**fd_results**			
Description:		FD processing results			
attribute name	field no.	storage type	external format	character positions	attribute description
fdid	1	integer	9d	1-9	fd result id
pfdid	2	integer	9d	11-19	fd processing id
pfkid	3	integer	9d	21-29	fk processing id
sta	4	varchar2(6)	a6	31-36	station
sourcenum	5	integer	9d	38-46	number of sources
timeini	6	float(53)	17.5f	48-64	time in
timeend	7	float(53)	17.5f	66-82	time end
maxfc	8	float(24)	9.4f	84-92	
maxpfc	9	float(24)	9.4f	94-102	
maxfo	10	float(24)	9.4f	104-112	
c	11	float(24)	9.4f	114-122	C value
maxfc_time	12	float(53)	17.5f	124-140	time of maximum f value
etimeini	13	float(53)	17.5f	142-158	
etimeend	14	float(53)	17.5f	160-176	
emaxpfc	15	float(24)	9.4f	176-184	
emaxfc	16	float(24)	9.4f	186-194	
emaxfc_time	17	float(53)	17.5f	196-212	
emaxfo	18	float(24)	9.4f	214-222	
ec	19	float(24)	9.4f	224-232	
fktablename	20	float(53)	17.5f	234-250	fk result table

assoc_params

The **assoc_params** table defines parameters for association processing defined in the configuration file.

Table 2.5: assoc_params					
Relation:		**assoc_params**			
Description:		association processing parameters			
attribute name	field no.	storage type	external format	character positions	attribute description
passocid	1	integer	9d	1-9	association processing id
name	2	string(32)	32.32s	11-42	name of association process
assocthresh	3	float(53)	5.3f	44-48	association threshold
maxlat	4	float(53)	9.4f	50-58	maximum latitude
minlat	5	float(53)	9.4f	60-68	minimum latitude
maxlon	6	float(53)	9.4f	70-78	maximum longitude
minlon	7	float(53)	9.4f	80-88	minimum longitude
wlen	8	float(53)	8d	90-97	window length
overlapwlen	9	float(53)	8d	99-106	overlap window length
algorithm	10	string(15)	s15.15	108-122	association algorithm

assoc_results

The **assoc_results** table stores association results.

Table 2.6: assoc_results					
Relation:		**assoc_results**			
Description:		association results			
attribute name	field no.	storage type	external format	character positions	attribute description
associd	1	integer	9d	1-9	association result id
passocid	2	integer	9d	11-19	association processing id
eventid	3	integer	9d	21-29	event id
fdid	4	integer	9d	31-39	fd result id
fdtable	5	string(32)	32.32s	41-72	fd result table
qassoc	6	float(53)	5.3f	74-78	
qdetcluster	7	float(53)	5.3f	80-84	
net	8	varchar2(8)	a8	86-93	unique network identifier
timeini	9	float(53)	17.5f	95-111	
timeend	10	float(53)	17.5f	113-129	

loc_params

The **loc_params** table defines parameters for location processing defined in the configuration file.

Table 2.7: loc_params					
Relation:		**loc_params**			
Description:		location processing parameters			
attribute name	field no.	storage type	external format	character positions	attribute description
plocid	1	integer	9d	1-9	location processing id
name	2	string(32)	32.32s	11-42	
maxlat	3	float(53)	9.4f	44-52	maximum latitude
minlat	4	float(53)	9.4f	54-62	minimum latitude
maxlon	5	float(53)	9.4f	64-72	maximum longitude
minlon	6	float(53)	9.4f	74-82	minimum longitude
priors	7	integer	9d	84-92	priors used
algorithm	8	string(15)	s15.15	94-108	location algorithm

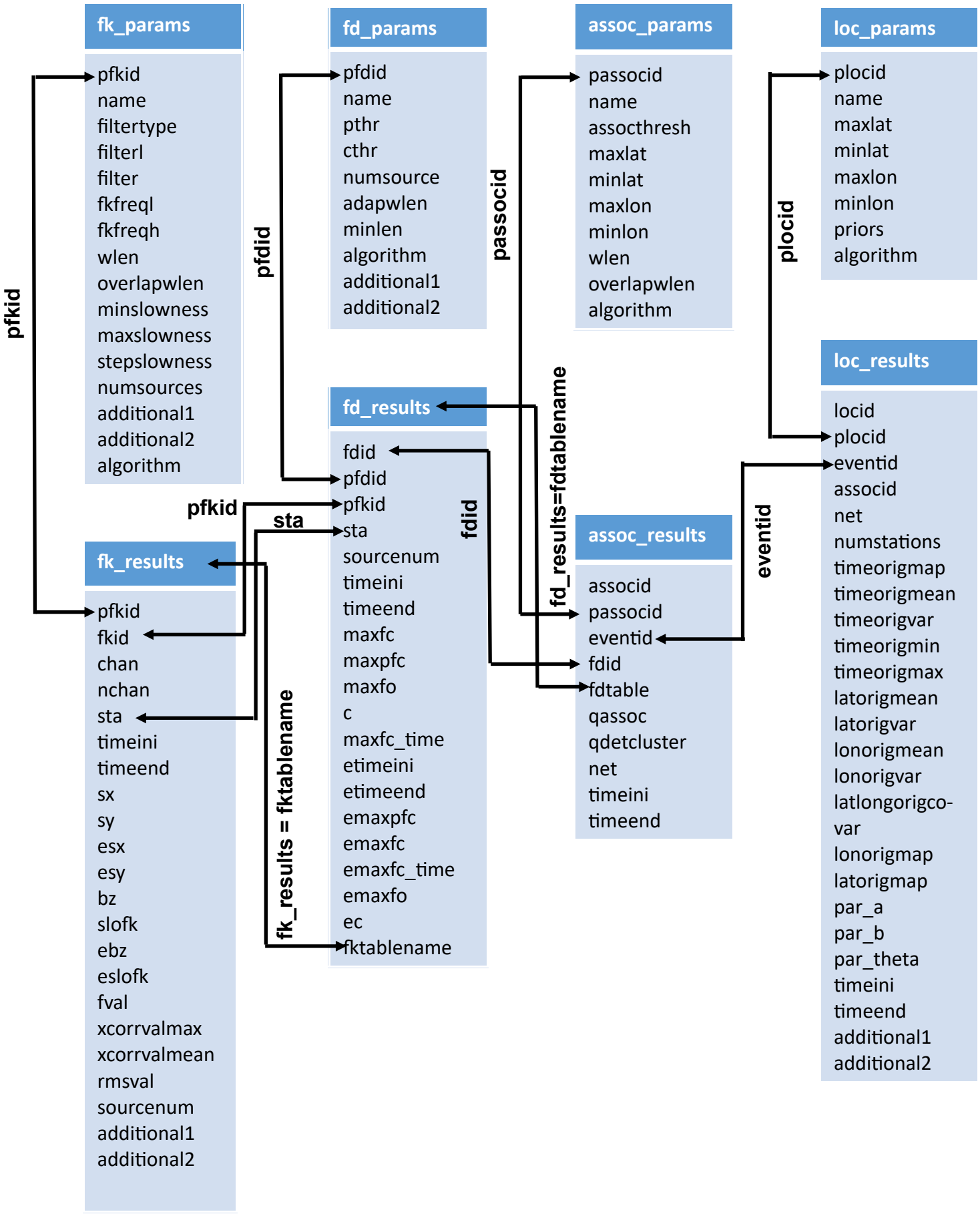
loc_results

The **loc_results** table stores location results.

Table 2.8: loc_results					
Relation:		**loc_results**			
Description:		location processing results			
attribute name	field no.	storage type	external format	character positions	attribute description
locid	1	integer	9d	1-9	location result id
plocid	2	integer	9d	11-19	location processing id
eventid	3	integer	9d	21-29	event id
net	4	varchar2(8)	a8	31-39	network
numstations	5	integer	9d	41-49	number of stations
timeorigmap	6	float(53)	17.5f	51-67	MAP origin time
timeorigmean	7	float(53)	17.5f	69-85	mean origin time
timeorigvar	8	float(53)	17.5f	87-103	origin time variance
timeorigmin	9	float(53)	17.5f	105-121	minimum origin time
timeorigmax	10	float(53)	17.5f	123-139	maximum origin time
latorigmean	11	float(53)	9.4f	141-149	mean origin latitude
latorigvar	12	float(53)	9.4f	151-159	origin latitude variance
lonorigmean	13	float(53)	9.4f	161-169	mean origin longitude
lonorigvar	14	float(53)	9.4f	171-179	origin longitude variance
latlonorigcovar	15	float(53)	9.4f	181-189	origin lat lon covariance
lonorigmap	16	float(53)	9.4f	191-199	MAP origin longitude
latorigmap	17	float(53)	9.4f	201-209	MAP origin latitude
par_a	18	float(24)	9.4f	211-219	?
par_b	19	float(24)	9.4f	221-229	?
par_theta	20	float(24)	9.4f	231-239	?
timeini	21	float(53)	17.5f	241-257	?
timeend	22	float(53)	17.5f	259-275	?
additional1	23	float(24)	9.4f	277-285	?
additional2	24	float(24)	9.4f	289-297	?
additional3	25	float(24)	9.4f	299-107	?
additional4	26	float(24)	9.4f	109-117	?

3.0 Table Relationships

Figure 1 describes relationships between tables. The table is always shown at the top of the table symbol.


fk_params
pfkid
name
filtertype
filterl
filter
fkfreql
fkfreqh
wlen
overlapwlen
minslowness
maxslowness
stepslowness
numsources
additional1
additional2
algorithm
fd_params
pfdid
name
pthr
cthr
numsource
adapwlen
minlen
algorithm
additional1
additional2
assoc_params
passocid
name
assocthresh
maxlat
minlat
maxlon
minlon
wlen
overlapwlen
algorithm
loc_params
plocid
name
maxlat
minlat
maxlon
minlon
priors
algorithm
pfkid
pfdid
passocid
plocid
fd_results
fdid
pfdid
pfkid
sta
sourcenum
timeini
timeend
maxfc
maxpfc
maxfo
c
maxfc_time
etimeini
etimeend
emaxpfc
emaxfc
emaxfc_time
emaxfo
ec
fktablename
fd_results=fdtablename
loc_results
locid
plocid
eventid
associd
net
numstations
timeorigmap
timeorigmean
timeorigvar
timeorigmin
timeorigmax
latorigmean
latorigvar
lonorigmean
lonorigvar
latlongorigco-
var
lonorigmap
latorigmap
par_a
par_b
par_theta
timeini
timeend
additional1
additional2
pfkid
sta
fdid
eventid
assoc_results
associd
passocid
eventid
fdid
fdtable
qassoc
qdetcluster
net
timeini
timeend
fk_results
pfkid
fkid
chan
nchan
sta
timeini
timeend
sx
sy
esx
esy
bz
slofk
ebz
eslofk
fval
xcorrvalmax
xcorrvalmean
rmsval
sourcenum
additional1
additional2
fk_results = fktablename