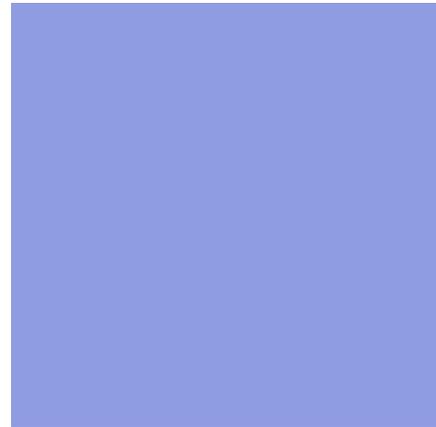




**UNIVERSITÉ
RENNES** ue

Résolution de problèmes en géomatique



Modélisation et visualisation spatio-temporelles

M2 SIGAT
Automne 2020

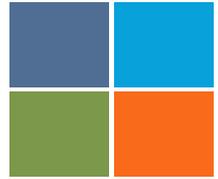
@Boris Mericskay



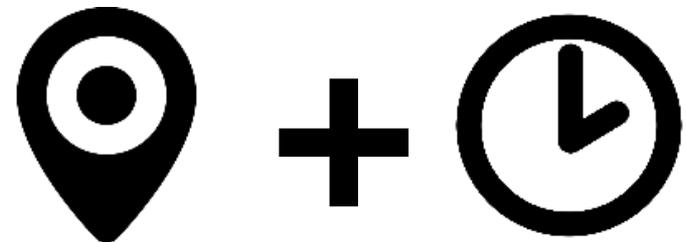
+ Les données spatio-temporelles



Petit point sur ces données

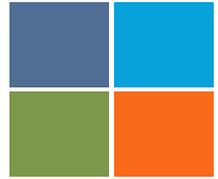


- Une donnée spatio-temporelle peut être définie comme une donnée spatiale dont la forme et/ou la position varie(nt) au cours du temps
 - Modélisation logique de l'information géographique à référence spatial et temporel
- modéliser les évolutions du monde réel et de traiter des données spatio-temporelles
- Compréhension de la dynamique des phénomènes du monde réel

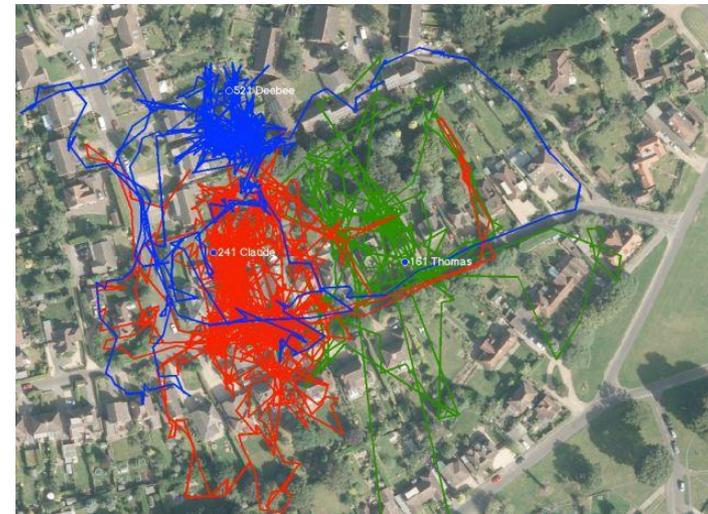
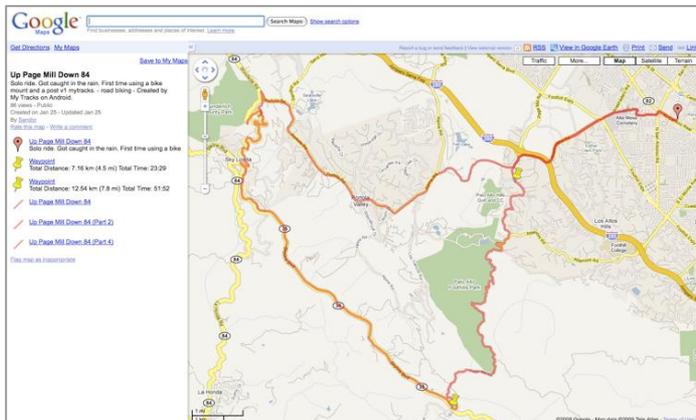




Petit point sur ces données

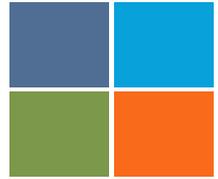


- A l'origine, les bases de données étaient essentiellement destinées à stocker des informations traditionnelles.
- Au fil des années, l'usage des bases de données s'est fortement étendu, en raison de l'apparition de nouveaux types d'application
- Développement des technologies SIG
- Développement des dispositifs GPS

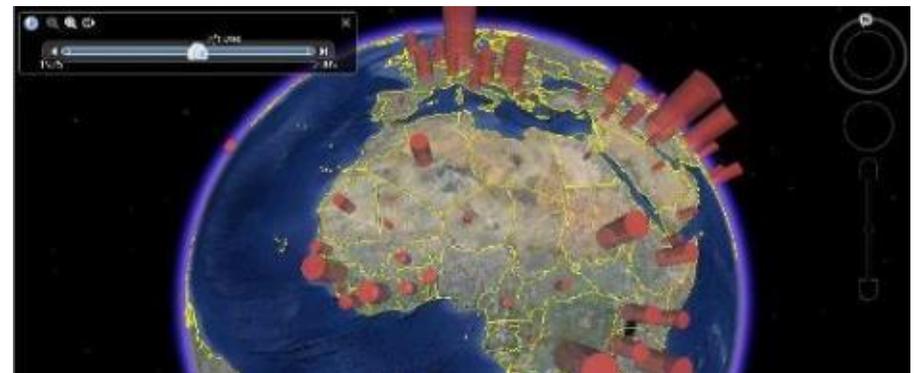




Le temps

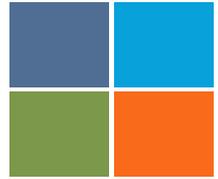


- Notion si familière pour chacun de nous, le temps n'en demeure pas moins un élément complexe
- Cette difficulté réside dans son **caractère interdisciplinaire** et en fonction du domaine d'utilisation, il aura une définition différente
- Cela pose bon nombre de problèmes, tant au niveau de la conceptualisation qu'au niveau de la représentation
- Exemple représenter l'évolution de la démographie sur un an, un siècle ou un millénaire induira des traitements et des modalités de visualisation différentes





Le temps

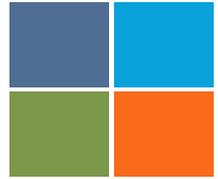


- 3 attributs permettent de représenter un instant sur la ligne du temps :
 - **Date** : Représente une date bien précise (année - mois - jour)
 - **Time** : Représente une heure bien précise (heure - minute - seconde)
 - **Timestamp** : Représente une seconde (ou microseconde) bien précise d'un jour donné (JJ/MM/AAAA HH/MM/SS)
- C'est par l'intermédiaire de ces trois attributs que les SGBD standards gèrent la temporalité des données

I	X	Y	id	TimeStamp	date	year	month	day	week	dow	time
2	-117.1318866	32.777959596	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
3	-117.1124845	32.698722603	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
4	-117.0865162	32.694508032	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
5	-117.0864267	32.689180689	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
6	-117.0770001	32.688044552	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
7	-117.0448934	32.706274813	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
8	-117.2272408	33.294116888	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
9	-117.1380140	32.949457873	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
10	-117.2461705	32.791904655	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
11	-117.0336853	32.751149811	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
12	-117.0447517	32.690387603	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00
13	-117.0959676	33.137489631	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00
14	-117.3010042	33.240444281	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00
15	-116.9145742	32.755054788	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00
16	-117.1667934	32.995508263	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00
17	-117.1209088	32.803186026	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00



Le timestamp



- L'horodatage (en anglais *timestamp*) est un mécanisme qui consiste à associer une date et une heure à un événement, une donnée
 - Il a généralement pour but d'enregistrer l'instant auquel une opération a été effectuée.

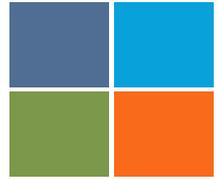


Timestamps have to be in one of the following formats:

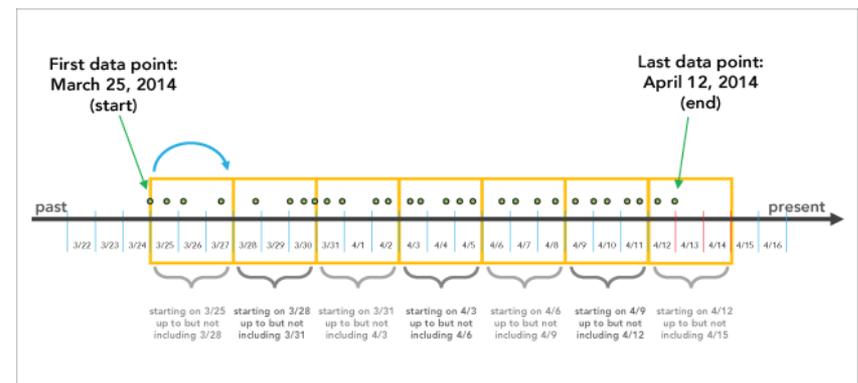
- %Y-%m-%d %H:%M:%S.%f
- %Y-%m-%d %H:%M:%S
- %Y-%m-%d %H:%M
- %Y-%m-%dT%H:%M:%S
- %Y-%m-%dT%H:%M:%SZ
- %Y-%m-%dT%H:%M
- %Y-%m-%dT%H:%MZ
- %Y-%m-%d
- %Y/%m/%d %H:%M:%S.%f
- %Y/%m/%d %H:%M:%S
- %Y/%m/%d %H:%M
- %Y/%m/%d
- %H:%M:%S
- %H:%M:%S.%f
- %Y.%m.%d %H:%M:%S.%f
- %Y.%m.%d %H:%M:%S
- %Y.%m.%d %H:%M
- %Y.%m.%d
- %Y%m%d%H%M%SED
- Integer timestamp in seconds after or before the epoch (1970-1-1)



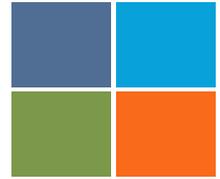
Petit point sur ces données



- Quelle que soit la perception que l'on a du temps, on peut résumer les différents concepts temporels nécessaires à sa modélisation :
 - **Événement** : Représente (un instant bien précis) sur la ligne du temps
 - Enregistrement GPS
 - **Intervalle temporel** : de modélisation/ représentation
 - Toutes les seconde, les minutes, les heures, les jours
 - **Période**: Représente un ensemble d'intervalles
 - Sur une journée, une semaine, un mois



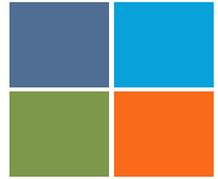
+ Deux environnements



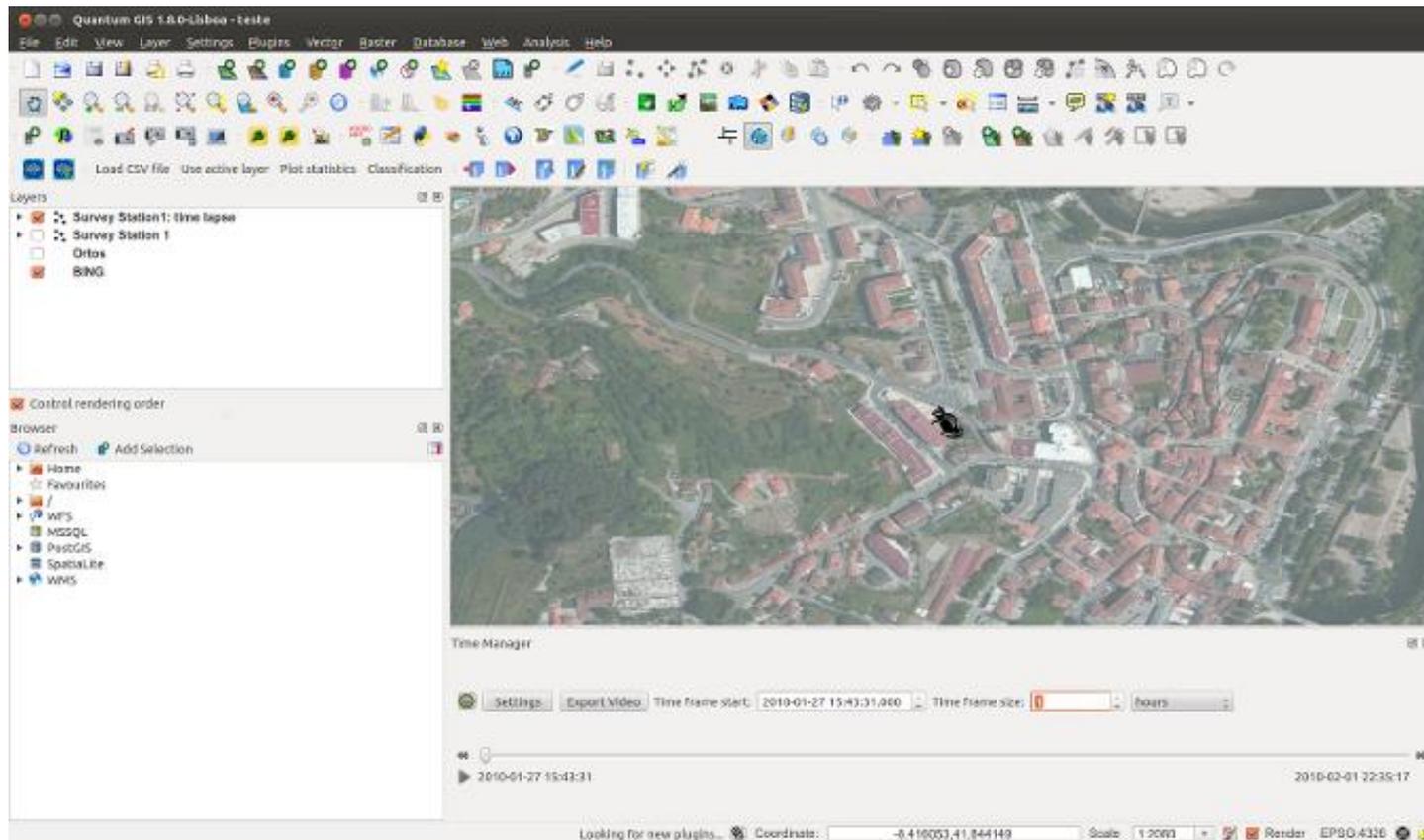
KeplerGL



+ Deux environnements

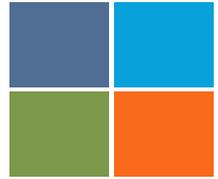


QGIS avec time manager (extension de QGIS)





Time manager dans QGIS



- Extension de QGIS
- Pour la trouver aller dans le dépôt d'extension

The screenshot shows the QGIS Extensions Manager window titled "Extensions | Toutes (358)". On the left, there is a sidebar with "Toutes", "Installées", "Non installées", and "Paramètres". The main area is divided into a search bar with "layer" entered, a list of extensions, and a detailed view of the selected "TimeManager" extension.

TimeManager

Cette extension est expérimentale

TimeManager adds time controls to QGIS. Using these time controls, you can animate vector features based on a time attribute. There is also an experimental raster layer support. You can create animations directly in the map window and export image series.

☆☆☆☆☆ 29 évaluation(s), 19112 téléchargements

Étiquettes: spatio-temporal,time,animation
Plus d'infos: [Page d'accueil](#) [gestionnaire de bugs](#) [code repository](#)

Auteur: [Anita Graser, Karolina Alexiou \(aka carolinux\)](#)

Version installée : 1.5.1 (dans C:\Users\rien\.qgis2\python\plugins\timemanager)
Version disponible : 1.5.1 (dans Dépôt officiel des extensions QGIS)

Journal des modifications :

- 1.5.1
 - fixed #98 Qgis 2.6.1 chrashes after updating Timemanager
- 1.5
 - iterative improvements by <https://github.com/carolinux>:
 - implemented #78 Add GUI for timestamp label settings
 - implemented #27 Support looping when playing backwards
 - implemented #93 Refactor read/write settings logic
 - updated documentation
 - introduced continuous testing via Travis & test coverage reports via coveralls
 - wrote more tests (postgresql data layers, reading & writing settings)

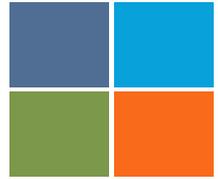
Tout mettre à jour

Désinstaller Ré-Installer l'extension

Fermer Aide



Time manager dans QGIS



- Activer les fonctionnalités

The screenshot shows the QGIS 2.6.1 Brighton interface. The 'Boîte à outils' (Toolbox) is open, and the 'Time Manager' tool is highlighted with a red dashed box. The 'Time Manager' tool is also highlighted with a red dashed box in the bottom toolbar. The 'Time Manager' tool is currently disabled, as indicated by the 'not set' text next to it. The 'Time Manager' tool is used to manage the time dimension of a map, allowing users to view historical data and create time-based maps.

The interface includes a menu bar (Projet, Éditer, Vue, Couche, Préférences, Extension, Vecteur, Raster, Base de données, Internet, MMQGIS, Traitement, Aide), a toolbar, a 'Couches' (Layers) panel on the left, a 'Tile Map Scale Levels' panel, and a 'Tool Options' panel. The 'Time Manager' tool is located in the bottom toolbar, and its options are visible in the 'Boîte à outils' panel.

The 'Boîte à outils' panel contains the following tools:

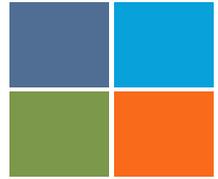
- Boîte à outils
- Annuler/Refaire
- Aperçu
- Chemin le plus court
- Couches
- Échelle de tuile
- go2streetview
- Information GPS
- Journal des messages
- Navigateur (2)
- Ordre des couches
- Parcourir
- QuickOSM - Fichier OSM
- QuickOSM - Mes requêtes
- QuickOSM - Requête
- QuickOSM - Requête rapide
- Saisie de coordonnées
- Tile Map Scale Levels
- Time Manager
- Aide
- Attributs
- Base de données
- Contrôle des couches
- Étiquette
- Extensions
- Fichier
- Google Maps Engine Connector
- GRASS
- Navigateur de carte
- Numérisation
- Numérisation avancée
- QSphere
- Raster
- Site Internet
- Vecteur

The 'Time Manager' tool is currently disabled, as indicated by the 'not set' text next to it. The 'Time Manager' tool is used to manage the time dimension of a map, allowing users to view historical data and create time-based maps.

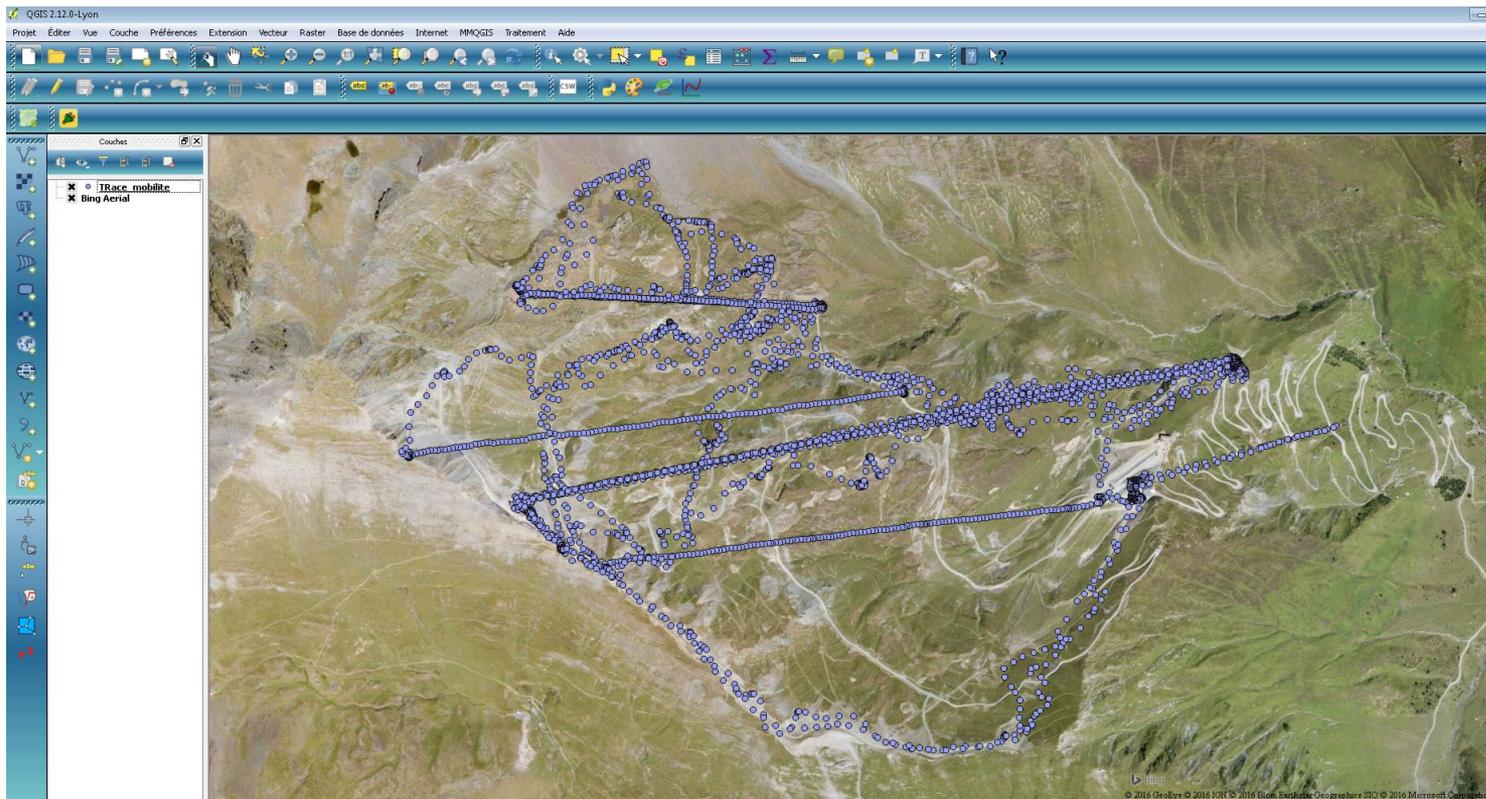


+ Visualisation spatio-temporelle
d'une trace GPS avec QGIS

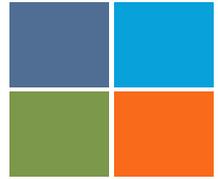
+ Trace GPS avec QGIS



- Importer le fichier GPX « TRace_mobilite.shp »
 - Visualisation des points de GPS



+ Trace GPS avec QGIS



- Structuration du jeux de données GPS
 - Colonne DateTime: déjà formatée dans un format temporelle
 - Année-mois-jour Heure-minute-seconde

Table attributaire - TRace_mobilite :: Total des entités: 3851, filtrés: 3851, sélectionnés: 0

	datetime	timestamp	lat	lon
39	2016-01-23 09:43:23	1453542203	42.88234599999...	-0.15565600000...
41	2016-01-23 09:43:33	1453542213	42.88231100000...	-0.15564500000...
42	2016-01-23 09:43:38	1453542218	42.88229499999...	-0.15562800000...
43	2016-01-23 09:43:43	1453542223	42.88228000000...	-0.15562300000...
44	2016-01-23 09:43:48	1453542228	42.88227299999...	-0.15561600000...
45	2016-01-23 09:43:53	1453542233	42.88227100000...	-0.15561000000...

+ Trace GPS avec QGIS



➤ Paramétrer Time Manager

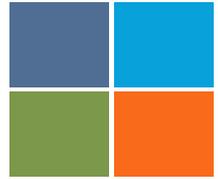
2 / Importer la couche

3 / Définissez la colonne temps

1 / Accéder aux paramètres de Time Manager

4 / Définissez les paramètres d'affichage des données (durée d'une carte)

+ Trace GPS avec QGIS



Une fois tous les paramètres rentrés, vous pouvez visualiser l'animation spatio-temporelle

1 / Activer la visualisation spatio-temporelle

Paramètres Exporter la vidéo Date de début : 2016-01-23 14:50:08.000 Durée d'une carte : 1 minutes

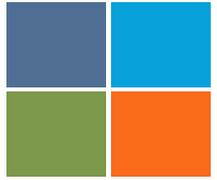
2 / Lancer la visualisation spatio-temporelle

2016 2016-01-23 15:28:58



Visualisation spatio-temporelle de la criminalité sous QGIS

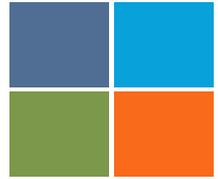
+ De retour a San Diego !



- Importer le jeu de données *crimes.shp*
- Exporter le fichier en CSV



Formatage des données

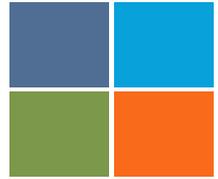


- Ouvrir le fichier CSV avec un tableur (excel ou openoffice)

A1	X,Y,id,date,year,month,day,week,dow,time,hour,is_night,type,address,city,segment_id,nbrhood,community,comm_pop,council,council_po,asr_zone,lampdist,lat,lon,desc,gctype,gquality																								
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R							
1	X,Y,id,date,year,month,day,week,dow,time,hour,is_night,type,address,city,segment_id,nbrhood,community,comm_pop,council,council_po,asr_zone,lampdist,lat,lon,desc,gctype,gquality																								
2	-117.13188662094352,32.777959599654824,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,ASSAULT,10000	Block Rio San Diego Drive,SndSAN,179314,SanSSI,SanMSS,18947,San007,3,6324,32.777959599654824,-117.131886620943530,CAUSE GREAT BODILY																							
3	-117.11249458784885,32.698722603325038,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,BURGLARY,700	S Block 38Th Street,SndSAN,4883,SanMON,SanSOT,57358,San009,2,1414,32.698722603325038,-117.112494587848870,RESIDENTIAL BURGLARY,cns																							
4	-117.08651628326254,32.694508032459190,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,BURGLARY,5000	Block Reynolds Street,SndSAN,54971,SanLNC,SanENC,47361,San004,1,1414,32.694508032459190,-117.086516283262550,RESIDENTIAL BURGLARY,cns																							
5	-117.08642673628533,32.689180680877818,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,FRAUD,2200	E Block Division Street,SndNAT,24667,NONE,NONE,0,NONE,0,0,32.689180680877818,-117.086426736285350,FRAUD,cns/segment,65																							
6	-117.07700015861005,32.68804455234477,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,FRAUD,3000	E Block 04Th Street,SndNAT,1357,NONE,NONE,0,NONE,0,0,32.688044552344770,-117.077000158610050,FRAUD,cns/segment,65																							
7	-117.04489343124258,32.70627481328852,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,FRAUD,7000	Block Springfield Avenue,SndSAN,59026,SanSKL,SanSKY,67273,San004,1,3162,32.70627481328852,-117.044893431242580,FRAUD,cns/segment,65																							
8	-117.2272408676155,33.294116886180554,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,FRAUD,5200	Block Triple Crown Row,SndSDO,110154,NONE,NONE,0,NONE,0,0,33.294116886180554,-117.22724086761570,FRAUD,cns/segment,35																							
9	-117.13801407311108,32.949457873671435,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,FRAUD,8700	Block Ginger Snap Lane,SndSAN,74804,SanRNC,SanRNC,42779,San006,1,7000,32.949457873671435,-117.138014073111080,FRAUD,cns/segment,65																							
10	-117.2461705059802,32.791904655597371,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,THEFT/LARCENY,4000	Block Everts Street,SndSAN,28262,SanPCF,SanPCF,39849,San002,1,2236,32.791904655597371,-117.246170505980200,PETTY THEFT / THEFT OF																							
11	-117.03368534923212,32.751149811198083,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,VEHICLE BREAK-IN/THEFT,7600	Block Seattle Drive,SndLAM,167952,NONE,NONE,0,NONE,0,0,32.751149811198083,-117.033685349232120,VEHICLE BREAK-IN/THE																							
12	-117.04475177845656,32.690387603499914,0,2013-04-01,2013,4,4839,13,1,00:00:00,0,1,VEHICLE BREAK-IN/THEFT,700	Block Kingswood Street,SndSAN,32586,SanBAT,SanSKY,67273,San004,1,0,32.690387603499914,-117.044751778456560,VEHICLE BRE																							
13	-117.09596764712902,33.137489631158047,0,2013-04-01,2013,4,4839,13,1,00:01:00,0,1,FRAUD,1300	Block Morning View Drive,SndESC,83695,NONE,NONE,0,NONE,0,0,33.137489631158047,-117.095967647129020,FRAUD,cns/segment,65																							
14	-117.30100423280078,33.240444285801161,0,2013-04-01,2013,4,4839,13,1,00:01:00,0,1,FRAUD,4700	Block Mayflower Way,SndOCN,56827,NONE,NONE,0,NONE,0,0,33.240444285801161,-117.301004232800780,FRAUD,cns/segment,65																							
15	-116.91457423816367,32.755054788965633,0,2013-04-01,2013,4,4839,13,1,00:01:00,0,1,FRAUD,2000	Block Capri Court,SndSDO,88326,NONE,NONE,0,NONE,0,0,32.755054788965633,-116.914574238163680,FRAUD,cns/segment,65																							
16	-117.16679247549965,32.995508263705752,0,2013-04-01,2013,4,4839,13,1,00:01:00,0,1,FRAUD,7500	Block Plein Aire,SndSAN,162867,SanBLA,SanBLA,6653,San005,1,12000,32.995508263705752,-117.166792475499650,FRAUD,cns/segment,65																							
17	-117.12090882336634,32.803186026876617,0,2013-04-01,2013,4,4839,13,1,00:01:00,0,1,FRAUD,3200	Block West Canyon Avenue,SndSAN,154283,SanSER,SanKER,6417,San007,4,2000,32.803186026876617,-117.120908823366340,FRAUD,cns/segment,65																							
18	-117.02402936093524,33.234895336542472,0,2013-04-01,2013,4,4839,13,1,00:01:00,0,1,SEX CRIMES,28700	Block Cole Grade Road,SndSDO,161757,NONE,NONE,0,NONE,0,0,33.234895336542472,-117.024029360935240,OTHER SEX CRIME,cns/segment,65																							
19	-117.12414459409972,32.828719131307096,0,2013-04-01,2013,4,4839,13,1,00:04:00,0,1,VANDALISM,9400	Block Ruffin Court,SndSAN,35279,SanKER,SanKER,6417,San006,7,9055,32.828719131307096,-117.124144594099720,VANDALISM (\$400 OR MORE																							
20	-117.08183673887471,32.686698235919160,0,2013-04-01,2013,4,4839,13,1,00:05:00,0,1,DRUGS/ALCOHOL VIOLATIONS,2400	E Block 04Th Street,SndNAT,1353,NONE,NONE,0,NONE,0,0,32.686698235919160,-117.081836738874710,DISORDERLY CONDUCT																							
21	-117.24218424633843,33.202288953410097,0,2013-04-01,2013,4,4839,13,1,00:10:00,0,1,DRUGS/ALCOHOL VIOLATIONS,200	Block Main Street,SndVIS,36516,NONE,NONE,0,NONE,0,0,33.202288953410097,-117.242184246338440,"DRUNK IN PUBLIC: ALCOHOL																							
22	-117.2587336039764,33.204679274235374,0,2013-04-01,2013,4,4839,13,1,00:16:00,0,1,FRAUD,900	Block Olive Avenue,SndVIS,50198,NONE,NONE,0,NONE,0,0,33.204679274235374,-117.258733603976410,FRAUD,cns/segment,65																							
23	-117.08829706755536,33.106132525368729,0,2013-04-01,2013,4,4839,13,1,00:30:00,0,1,BURGLARY,700	W Block 13Th Avenue,SndESC,2774,NONE,NONE,0,NONE,0,0,33.106132525368729,-117.088297067555360,RESIDENTIAL BURGLARY,cns/segment,65																							
24	-117.21487464889041,32.845966486621428,0,2013-04-01,2013,4,4839,13,1,01:00:00,0,1,VEHICLE BREAK-IN/THEFT,5600	Block Tulane Street,SndSAN,61533,SanUNV,SanUNV,63098,San001,1,1414,32.845966486621428,-117.214874648890410,VEHICLE BREAK-IN/THEFT																							
25	-117.13384045780199,32.710828350191662,0,2013-04-01,2013,4,4839,13,1,01:01:00,0,1,WEAPONS,500	Block 28Th Street,SndSAN,3869,SanGRN,SanSOT,57358,San008,4,2236,32.710828350191662,-117.133840457802010,MANUFACTURE/SELL/POSSESS																							
26	-117.09025099792406,32.630728589647902,0,2013-04-01,2013,4,4839,13,1,01:15:00,0,1,DRUGS/ALCOHOL VIOLATIONS,600	H Block H Street,SndCHU,33807,NONE,NONE,0,NONE,0,0,32.630728589647902,-117.090250997924060,USE/UNDER INFLUENCE OF ALCOHOL																							
27	-117.1356820502552,32.708463147998366,0,2013-04-01,2013,4,4839,13,1,01:16:00,0,1,DRUGS/ALCOHOL VIOLATIONS,2700	Block K Street,SndSAN,39542,SanGRN,SanSOT,57358,San008,2,4123,32.708463147998373,-117.135682050255200,USE/UNDER INFLUENCE OF ALCOHOL																							
28	-117.32979759098247,33.226465161128139,0,2013-04-01,2013,4,4839,13,1,01:30:00,0,1,DRUGS/ALCOHOL VIOLATIONS,3800	Block Mission Avenue,SndOCN,202815,NONE,NONE,0,NONE,0,0,33.226465161128139,-117.329797590982470,DISORDERLY CONDUCT																							
29	-117.09536668581708,32.685817914715557,0,2013-04-01,2013,4,4839,13,1,01:46:00,0,1,DRUGS/ALCOHOL VIOLATIONS,1300	E Block 01st Street,SndNAT,420,NONE,NONE,0,NONE,0,0,32.685817914715557,-117.095366685817100,DISORDERLY CONDUCT																							
30	-117.09536668581708,32.685817914715557,0,2013-04-01,2013,4,4839,13,1,01:46:00,0,1,DRUGS/ALCOHOL VIOLATIONS,1300	E Block 01st Street,SndNAT,420,NONE,NONE,0,NONE,0,0,32.685817914715557,-117.095366685817100,DISORDERLY CONDUCT																							



Formatage des données



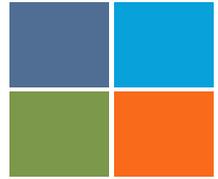
- Après avoir convertis vos données voici à quoi ressemble le tableur (données → convertir)

The screenshot shows an Excel spreadsheet with the following columns: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R. The data rows start from row 2. The first few rows of data are as follows:

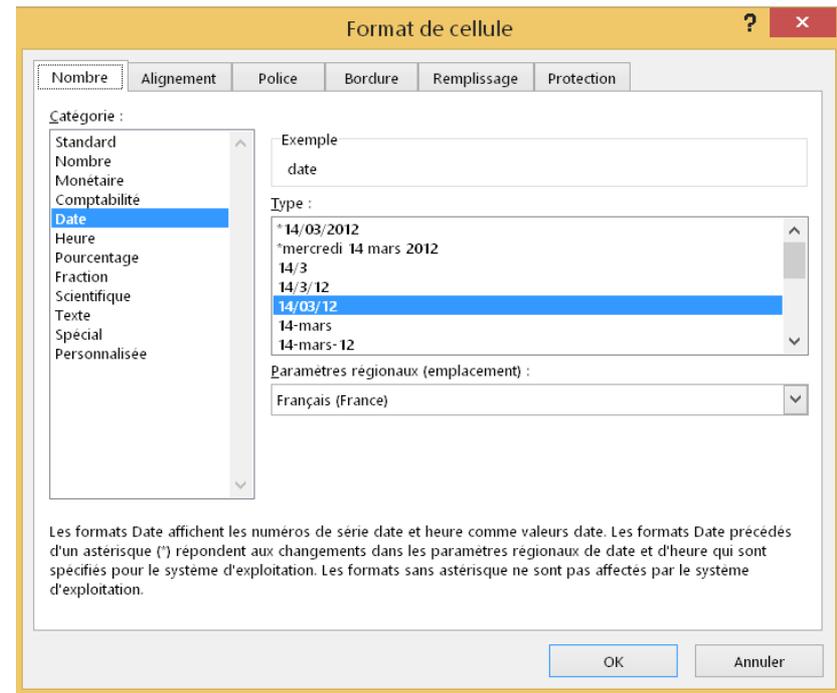
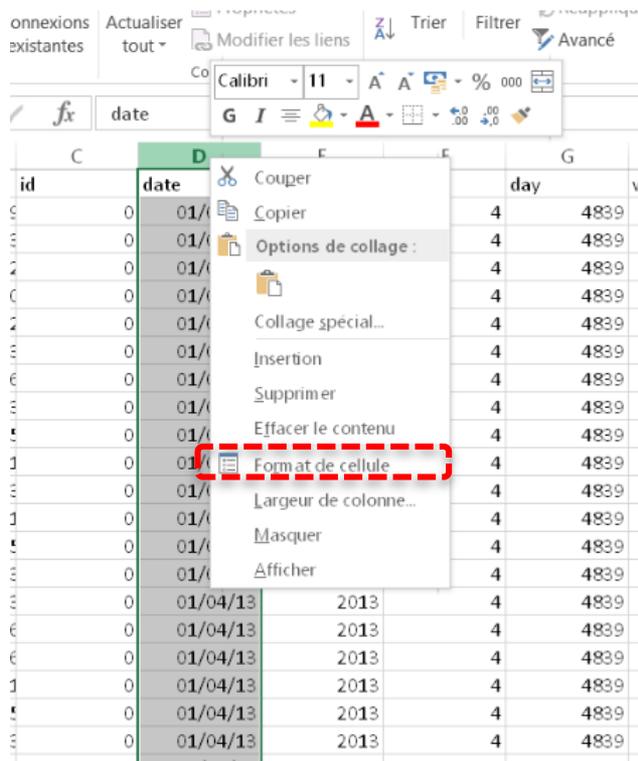
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	Y	id	date	year	month	day	week	dow	time	hour	is_night	type	address	city	segment_id	nbrhood	community
2	-117.1318966	32.77795959	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 ASSAULT	10000 Block I SndSAN		179314	SanSSI	SanMSS
3	-117.1124845	32.69872260	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 BURGLARY	700 S Block 3 SndSAN		4883	SanMON	SanSOT
4	-117.0965162	32.69450803	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 BURGLARY	5000 Block R SndSAN		54971	SanLNC	SanENC
5	-117.0964267	32.68918068	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 FRAUD	2200 E Block SndNAT		24667	NONE	NONE
6	-117.0770001	32.68804455	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 FRAUD	3000 E Block SndNAT		1357	NONE	NONE
7	-117.0448934	32.70627481	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 FRAUD	7000 Block Sj SndSAN		59026	SanSKL	SanSKY
8	-117.2272408	33.29411688	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 FRAUD	5200 Block Ti SndSDO		110154	NONE	NONE
9	-117.1380140	32.94945787	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 FRAUD	8700 Block G SndSAN		74804	SanRNC	SanRNC
10	-117.2461705	32.79190465	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 THEFT/LARCE	4000 Block E SndSAN		28262	SanPCF	SanPCF
11	-117.0336853	32.75114981	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 VEHICLE BRE/	7600 Block S SndLAM		167952	NONE	NONE
12	-117.0447517	32.69038760	0	01/04/2013	2013		4	4839	13	1	00:00:00	0	1 VEHICLE BRE/	700 Block Km SndSAN		32586	SanBAT	SanSKY
13	-117.0959676	33.13748963	0	01/04/2013	2013		4	4839	13	1	00:01:00	0	1 FRAUD	1300 Block M SndESC		83695	NONE	NONE
14	-117.3010042	33.24044428	0	01/04/2013	2013		4	4839	13	1	00:01:00	0	1 FRAUD	4700 Block M SndOCN		56827	NONE	NONE
15	-116.9145742	32.75505478	0	01/04/2013	2013		4	4839	13	1	00:01:00	0	1 FRAUD	2000 Block C SndSDO		83326	NONE	NONE
16	-117.1667934	32.99550826	0	01/04/2013	2013		4	4839	13	1	00:01:00	0	1 FRAUD	7500 Block F SndSAN		162867	SanELA	SanELA
17	-117.1209088	32.80318602	0	01/04/2013	2013		4	4839	13	1	00:01:00	0	1 FRAUD	3200 Block W SndSAN		154283	SanER	SanKER
18	-117.0240293	33.23489538	0	01/04/2013	2013		4	4839	13	1	00:01:00	0	1 SEX CRIMES	28700 Block I SndSDO		161757	NONE	NONE
19	-117.1241445	32.82871913	0	01/04/2013	2013		4	4839	13	1	00:04:00	0	1 VANDALISM	9400 Block R SndSAN		35279	SanKER	SanKER
20	-117.0818367	32.68869823	0	01/04/2013	2013		4	4839	13	1	00:05:00	0	1 DRUGS/ALCO	2400 E Block SndNAT		1353	NONE	NONE
21	-117.2421842	33.20228895	0	01/04/2013	2013		4	4839	13	1	00:10:00	0	1 DRUGS/ALCO	200 Block Me SndVIS		36516	NONE	NONE
22	-117.2587336	33.20467927	0	01/04/2013	2013		4	4839	13	1	00:16:00	0	1 FRAUD	800 Block Of SndVIS		50198	NONE	NONE
23	-117.0832970	33.10613252	0	01/04/2013	2013		4	4839	13	1	00:30:00	0	1 BURGLARY	700 W Block SndESC		2774	NONE	NONE
24	-117.2148746	32.84596648	0	01/04/2013	2013		4	4839	13	1	01:00:00	1	1 VEHICLE BRE/	5600 Block Ti SndSAN		61533	SanNUV	SanUNV
25	-117.1338404	32.71082835	0	01/04/2013	2013		4	4839	13	1	01:01:00	1	1 WEAPONS	500 Block 28 SndSAN		3869	SanGRN	SanSOT
26	-117.0902509	32.63072858	0	01/04/2013	2013		4	4839	13	1	01:15:00	1	1 DRUGS/ALCO	600 Block H SndCHU		33307	NONE	NONE
27	-117.1356820	32.70846314	0	01/04/2013	2013		4	4839	13	1	01:16:00	1	1 DRUGS/ALCO	2700 Block K SndSAN		39542	SanGRN	SanSOT
28	-117.3297975	33.22646516	0	01/04/2013	2013		4	4839	13	1	01:30:00	1	1 DRUGS/ALCO	8900 Block M SndOCN		202815	NONE	NONE
29	-117.0953666	32.68581791	0	01/04/2013	2013		4	4839	13	1	01:46:00	1	1 DRUGS/ALCO	1300 E Block SndNAT		420	NONE	NONE
30	-117.0953666	32.68581791	0	01/04/2013	2013		4	4839	13	1	01:46:00	1	1 DRUGS/ALCO	1300 E Block SndNAT		420	NONE	NONE



Formatage des données

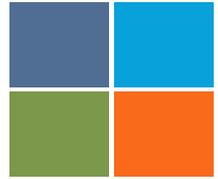


- Il faut d'abord **formater la colonne date** correctement
- Puis faire la même procédure avec la **colonne time**

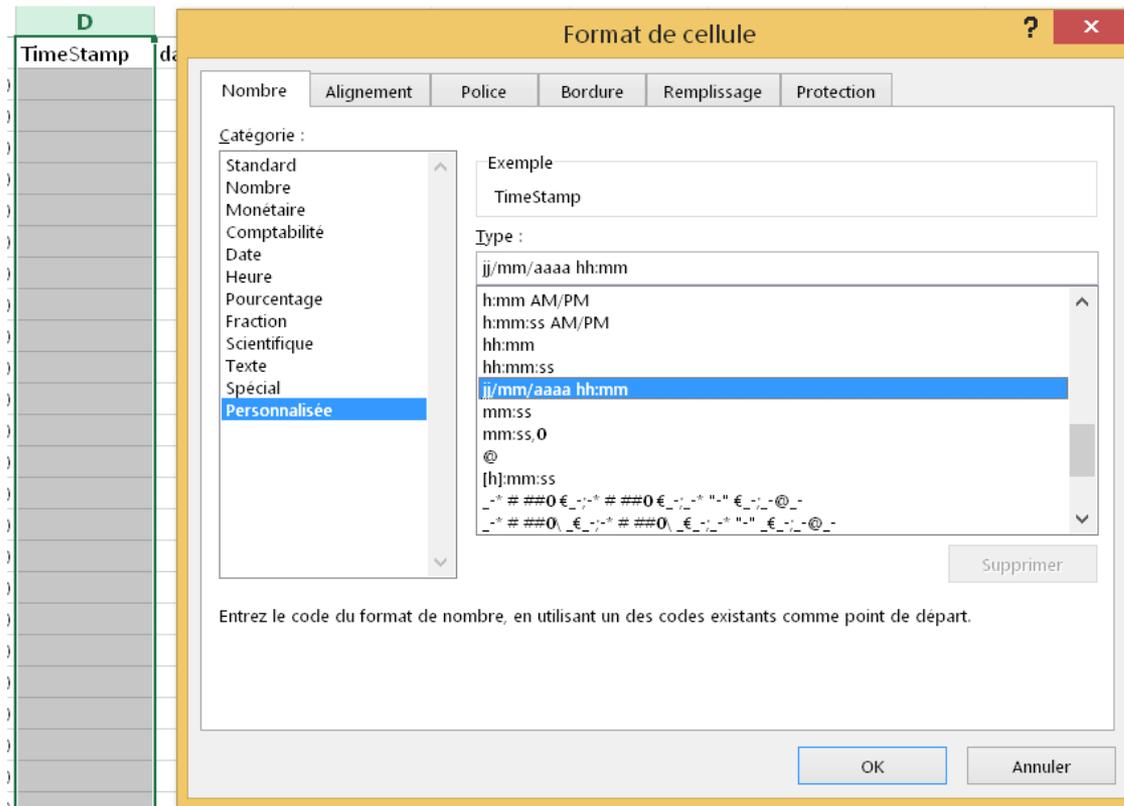




Formatage des données

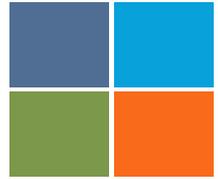


- Ensuite, il faut créer une nouvelle colonne qui va venir agréger ces deux données formatées





Formatage des données

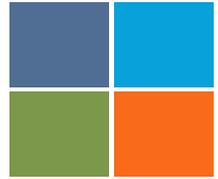


- Enfin il faut renseigner cette colonne pour qu'elle agrège correctement la colonne *time* et *date*

	D	E	F	G	H	I	J	K	
	TimeStamp	date	year	month	day	week	dow	time	h
0	=E2+K2	01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:00:00
0		01/04/13	2013		4	4839	13	1	0:01:00
0		01/04/13	2013		4	4839	13	1	0:01:00



Formatage des données

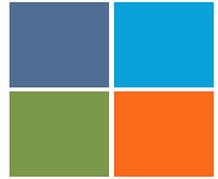


- Voilà, vous avez une nouvelle colonne avec un attribut temporel correctement formaté !

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	X	Y	id	TimeStamp	date	year	month	day	week	dow	time	hour	is_night
2	-117.1318866	32.77795959	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
3	-117.1124845	32.69872260	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
4	-117.0865162	32.69450803	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
5	-117.0864267	32.68918068	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
6	-117.0770001	32.68804455	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
7	-117.0448934	32.70627481	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
8	-117.2272408	33.29411688	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
9	-117.1380140	32.94945787	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
10	-117.2461705	32.79190465	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
11	-117.0336853	32.75114981	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
12	-117.0447517	32.69038760	0	01/04/2013 00:00	01/04/13	2013	4	4839	13	1	0:00:00	0	1
13	-117.0959676	33.13748963	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00	0	1
14	-117.3010042	33.24044428	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00	0	1
15	-116.9145742	32.75505478	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00	0	1
16	-117.1667934	32.99550826	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00	0	1
17	-117.1209088	32.80318602	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00	0	1
18	-117.0240293	33.23489533	0	01/04/2013 00:01	01/04/13	2013	4	4839	13	1	0:01:00	0	1
19	-117.1241445	32.82871913	0	01/04/2013 00:04	01/04/13	2013	4	4839	13	1	0:04:00	0	1
20	-117.0818367	32.68669823	0	01/04/2013 00:05	01/04/13	2013	4	4839	13	1	0:05:00	0	1
21	-117.2421842	33.20228895	0	01/04/2013 00:10	01/04/13	2013	4	4839	13	1	0:10:00	0	1
22	-117.2587336	33.20467927	0	01/04/2013 00:16	01/04/13	2013	4	4839	13	1	0:16:00	0	1
23	-117.0832970	33.10613252	0	01/04/2013 00:30	01/04/13	2013	4	4839	13	1	0:30:00	0	1
24	-117.2148746	32.84596648	0	01/04/2013 01:00	01/04/13	2013	4	4839	13	1	1:00:00	1	1
25	-117.1338404	32.71082835	0	01/04/2013 01:01	01/04/13	2013	4	4839	13	1	1:01:00	1	1
26	-117.0902509	32.63072858	0	01/04/2013 01:15	01/04/13	2013	4	4839	13	1	1:15:00	1	1
27	-117.1356820	32.70846314	0	01/04/2013 01:16	01/04/13	2013	4	4839	13	1	1:16:00	1	1
28	-117.3297975	33.22646516	0	01/04/2013 01:30	01/04/13	2013	4	4839	13	1	1:30:00	1	1
29	-117.0953666	32.68581791	0	01/04/2013 01:46	01/04/13	2013	4	4839	13	1	1:46:00	1	1
30	-117.0953666	32.68581791	0	01/04/2013 01:46	01/04/13	2013	4	4839	13	1	1:46:00	1	1

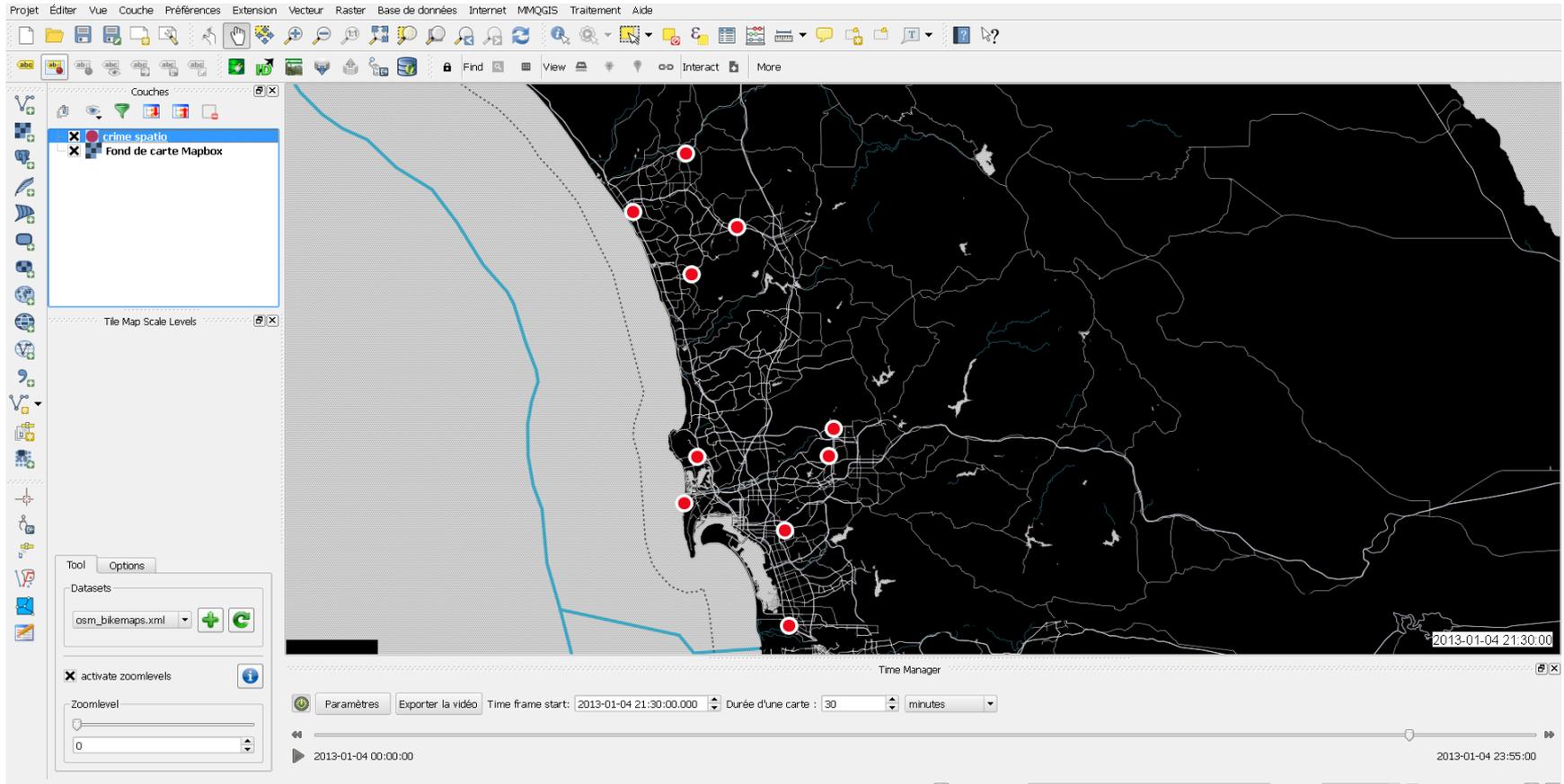
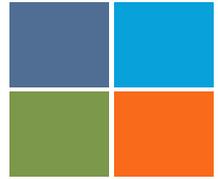


Visualisation sous QGIS



1. **Importer** le fichier CSV dans QGIS
2. **Exporter** le fichier CSV en format Shape
3. **Configurer Time manager** pour visualiser la criminalité du 2 avril heure par heure
 - Il faut ici configurer soit 1 heure ou alors 60 minutes
4. **Mettre un fond de carte esthétique** (exemple Stamen Toner)
5. **Mettre en forme les données** pour un rendu esthétique

+ Visualisation sous QGIS





Exporter une vidéo



1/ Exportation des différentes cartes (par date)

Tool Options

Datasets

osm_bikemaps.xml + C

activate zoomlevels i

Zoomlevel

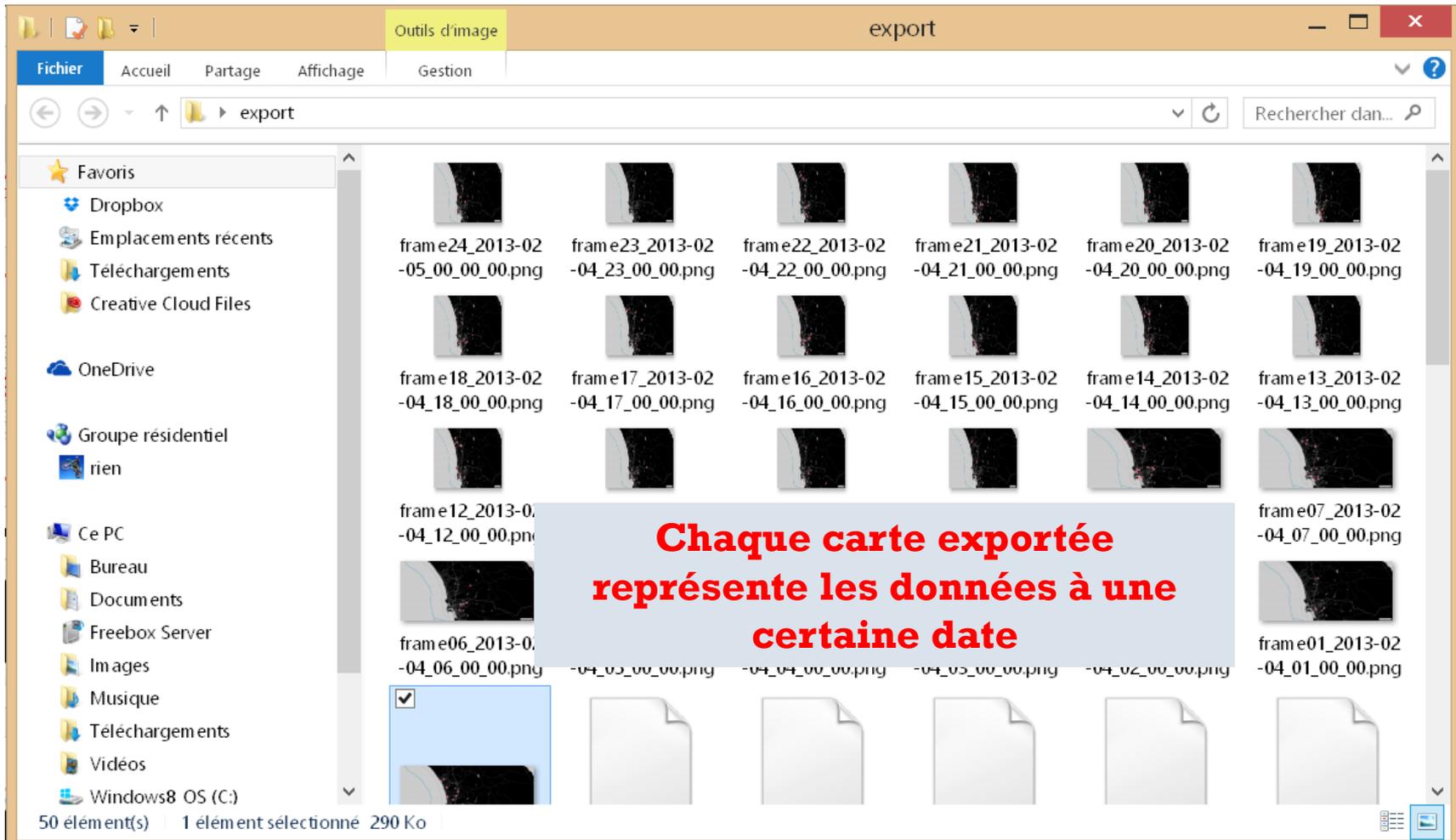
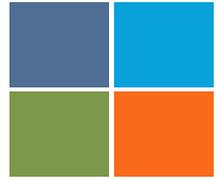
0

Paramètres Exporter la vidéo Time frame start: 2013-02-04 00:00:00.000 Durée d'une carte : 60

2013-02-04 00:00:00



Exporter une vidéo

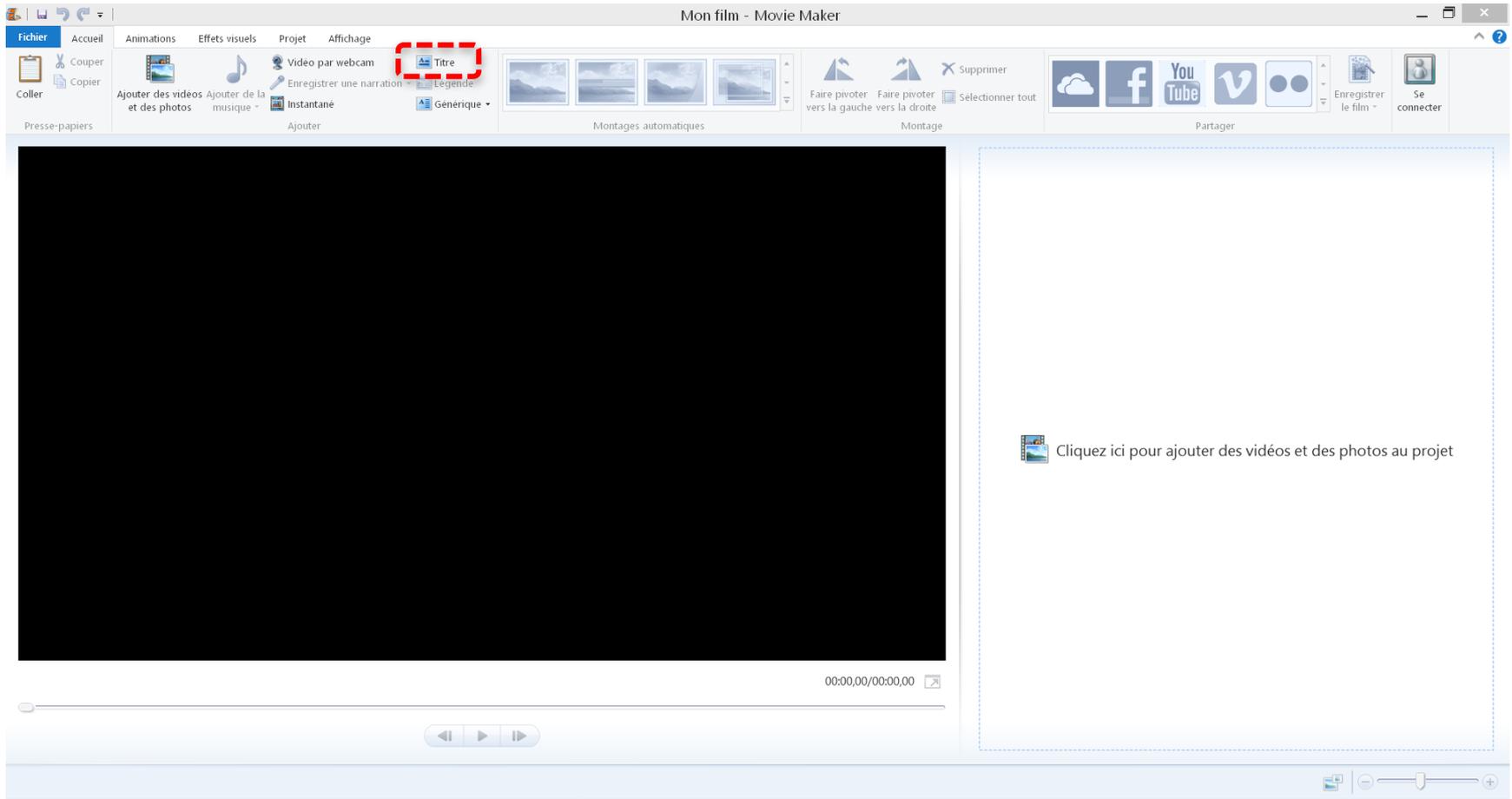
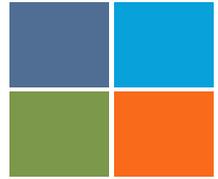




+

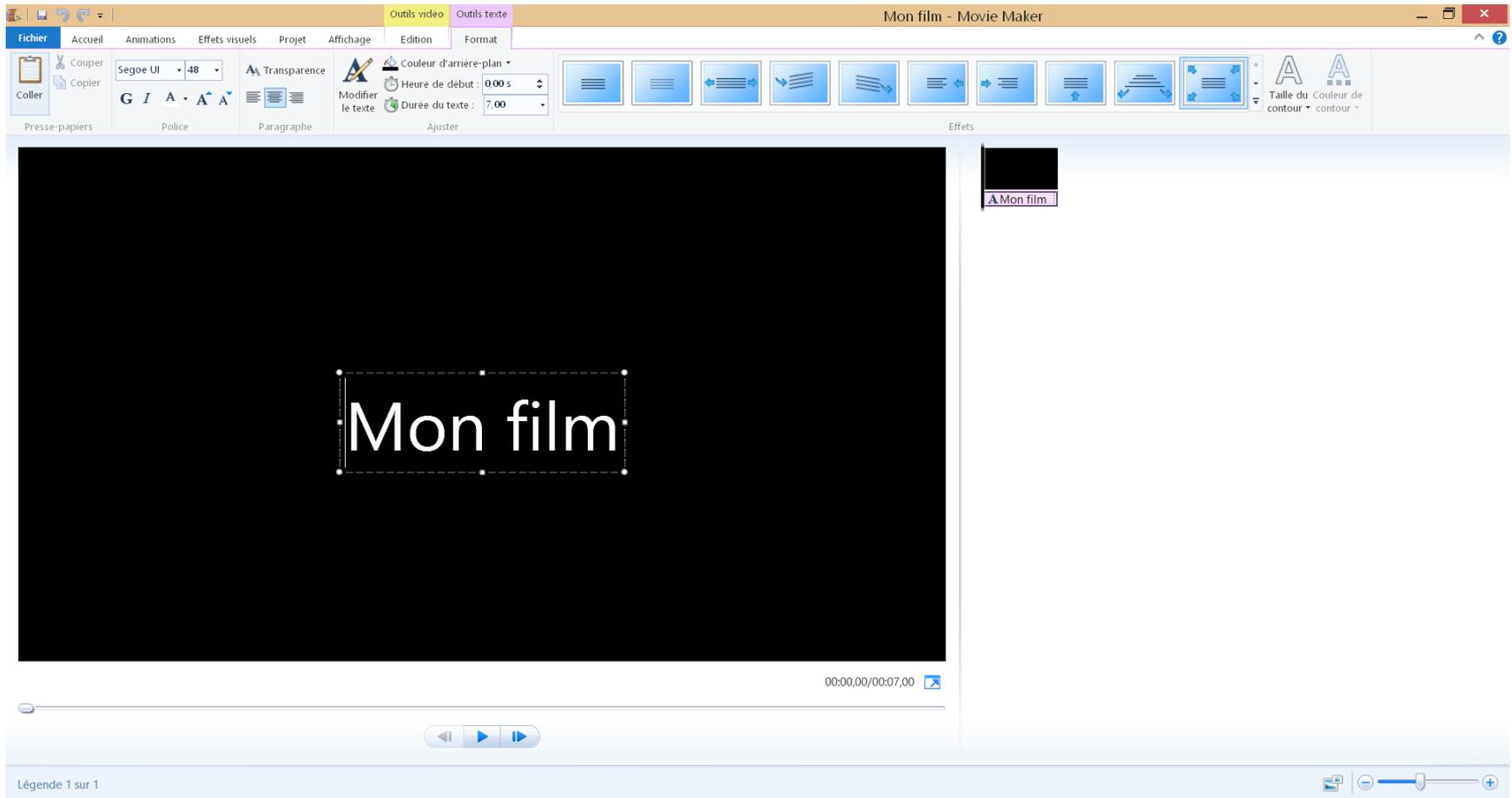
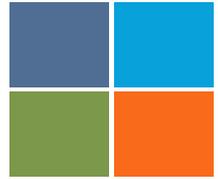
Du SIG à la vidéo

+ Windows Movie Maker



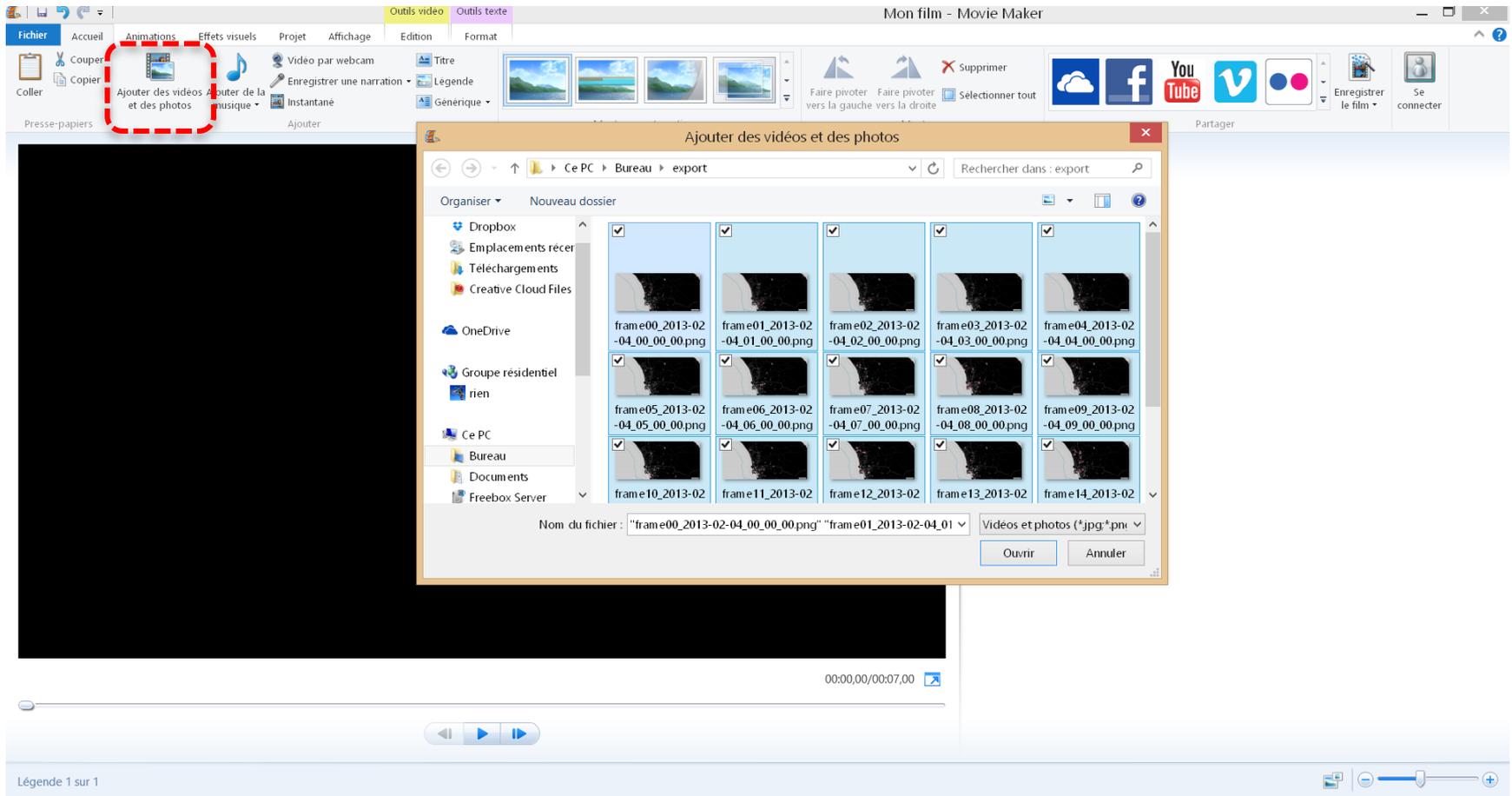
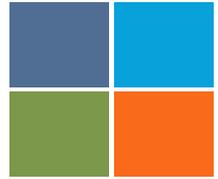


Ajouter un titre



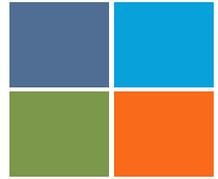


Importer les cartes





Configurer la vidéo



Fichier Accueil Animations Effets visuels Projet Affichage **Edition**

Apparition en fondu : []
Disparition en fondu : []
Vitesse : []
Couleur d'arrière-plan : []
Duree : 100 []
Fractionner []
Outil Decouper []
Definir le point de debut []
Definir le point de fin []
Stabilisation des videos []

Audio Ajuster Montage

Il faut configurer la durée d'affichage de chaque carte (0,5 ou 1 seconde)

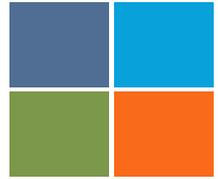
2013-02-05 00:00:00

00:32,00/00:32,00

25 éléments sélectionnés



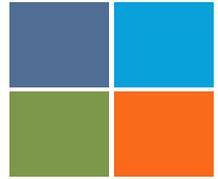
Ajouter du texte



The screenshot displays a video editing software interface. The top menu bar includes 'Fichier', 'Accueil', 'Animations', 'Effets visuels', 'Projet', 'Affichage', and 'Edition'. The ribbon below the menu contains various tools, with the 'Légende' (Legend) tool highlighted by a red dashed box. The main workspace shows a map with several red circular markers. The timeline at the bottom indicates a duration of 00:09,03 / 00:35,00. The right sidebar shows a preview window and a list of video clips.



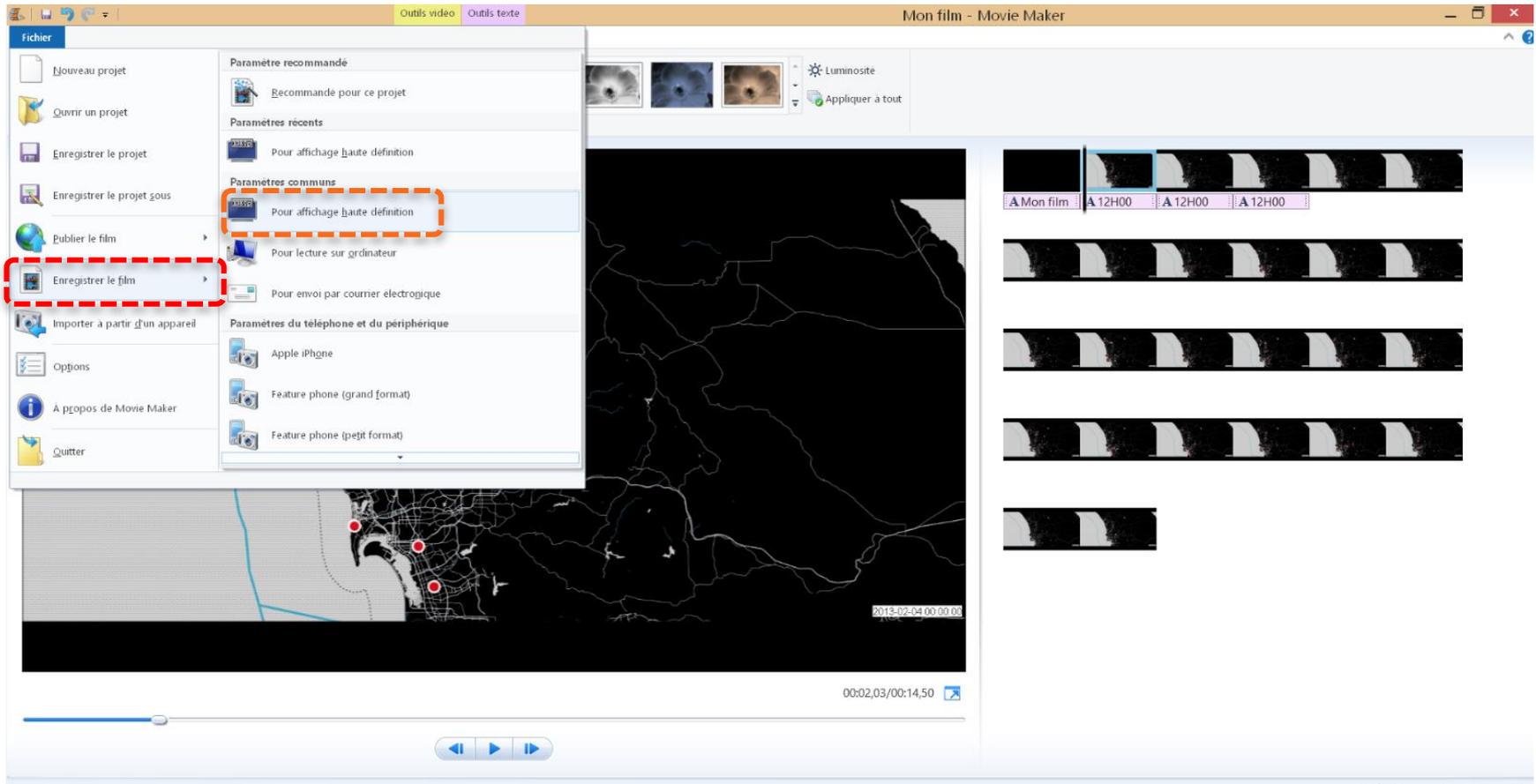
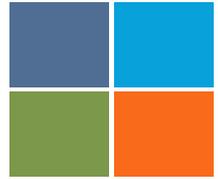
Ajouter du texte



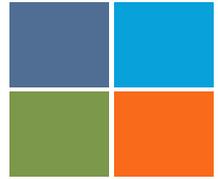
The screenshot displays the ArcGIS StoryMap software interface. The main workspace shows a map of a coastal region with several red location markers. A text box is overlaid on the map with the red text "Ajouter l'heure sur chaque carte". A text element "12H30" is being edited on the map, with a bounding box and handles visible. The software's ribbon includes tabs for "Fichier", "Accueil", "Animations", "Effets visuels", "Projet", "Affichage", "Edition", and "Format". The "Edition" tab is active, showing options for "Couper", "Copier", "Coller", "Police" (font settings for Segoe UI, size 24), "Paragraphe" (bullet points, indentation), "Ajouter" (background color, start time 9:00 s, duration 1:00), and "Effets" (text effects). A timeline at the bottom shows a play button and a progress bar at 00:09,03 / 00:35,00. The status bar at the bottom left indicates "Légende 3 sur 3".



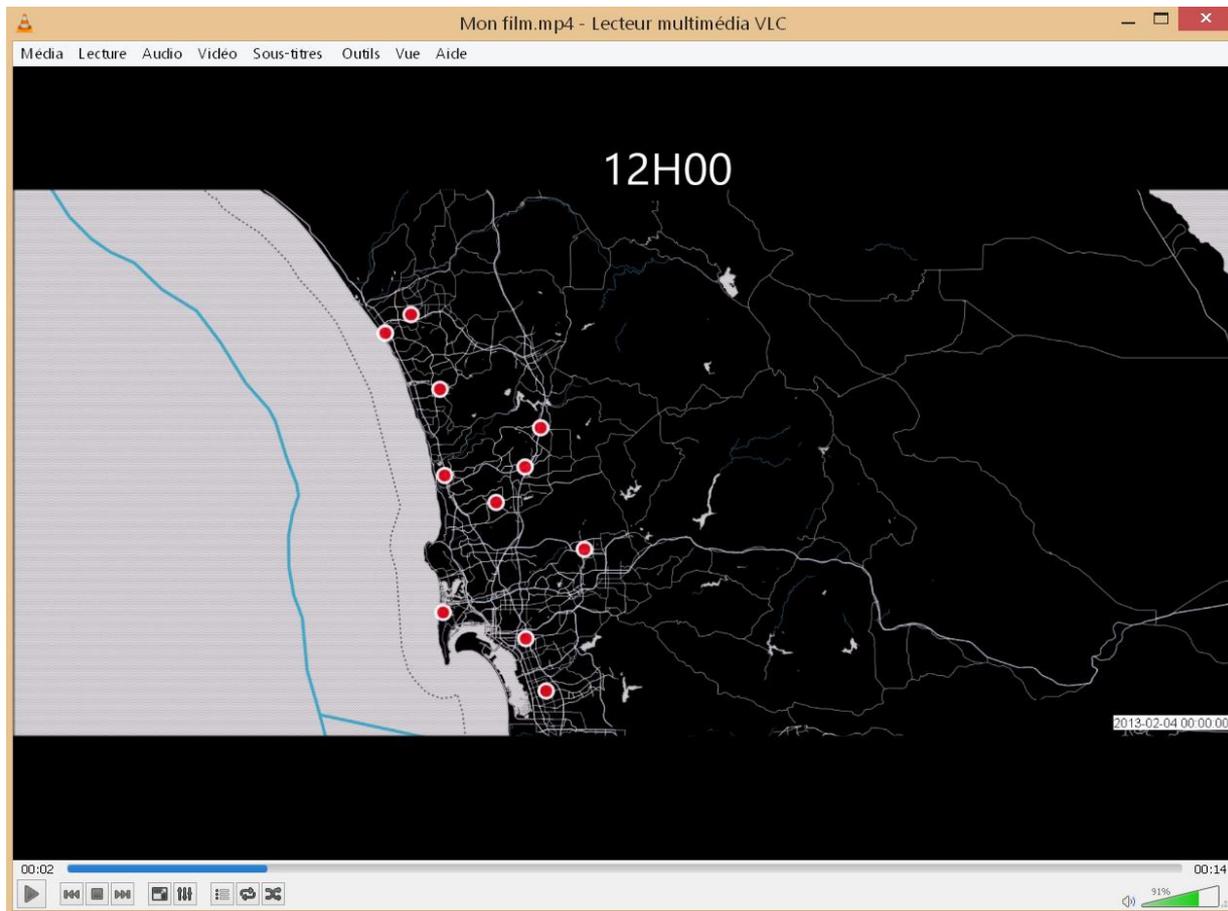
Exporter la vidéo



+ Vidéo



<http://youtu.be/2YKkfumC9ZI>



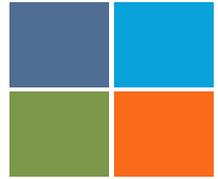


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Projet de séance



Rendu du cours



Individuellement vous devez produire une visualisation spatio-temporelle sur l'utilisation des vélos en libre service de Lyon (**12 mars**)

- Une vidéo d'environ 30 secondes (**avec Time manager QGIS**)
- Une visualisation dynamique en ligne **sur CARTO**

■ **Conseils :**

- Pour joindre les données des deux tableurs utilisez QGIS
- Pour structurer vos données utiliser un logiciel tableur
- Pour que time manager fonctionne utiliser le format .shp
- Dans QGIS possibilité de faire varier à la fois la couleur et la taille
- Pour que la colonne date soit prise en compte dans CARTO, à vous de reformater la colonne temporelle
- Possibilité de faire varier la couleur (attention variable qualitative)

https://annuel.framapad.org/p/Spatiotemporel_M1_SIGAT_-2016